LIBRARY
SCHOOL OF LAW S.C.
WITHDRAWN

1868

UNIVERSITY
OF CALIFORNIA
LOS ANGELES

SCHOOL OF LAW
LIBRARY

LIBRARY
SCHOOL OF LAW, B.C.

LIBRARY
SCHOOL OF LAW. S.C.
WITHDRAWN

PRINCIPLES

OF

MEDICAL JURISPRUDENCE:

DESIGNED FOR

THE PROFESSIONS OF LAW AND MEDICINE.

By AMOS DEAN,

COUNSELLOR AT LAW, AND PROFESSOR OF MEDICAL JURISPRUDENCE
IN THE ALBANY MEDICAL COLLEGE.

ALBANY:
GOULD, BANKS & GOULD, 475 BROADWAY,
NEW-YORK:
BANKS, GOULD & CO., 144 NASSAU ST.
1850.

REC'D SEP 2 1 1932
WITHDRAWN

22.406

T
D3442m
1850

Entered according to Act of Congress, in the year 1850, by
GOULD, BANKS & GOULD,
In the Clerk's Office of the District Court of the Northern District of New-York.

CHARLES VAN BENTHUYSEN,
PRINTER, ALBANY.

Dartmouth
Donor
KM 2-19-59

HON. JABEZ D. HAMMOND, LL. D.,

WHOSE TALENTS, VIRTUES AND MORAL WORTH

ENDEAR HIM TO THE PRESENT

AND COMMEND HIS NAME AND EXAMPLE TO THE FUTURE,

This Book is Inscribed,

AS A TESTIMONY OF REGARD AND ESTEEM

AND A TOKEN OF GRATEFUL REMEMBRANCE

By the Author.

PREFACE.

The topics embraced in the Science of MEDICAL JURISPRUDENCE have been constantly acquiring importance in proportion as the wants of society have increased, its resources multiplied, and the refinements of civilization become extended and enlarged. Although its principles have ever lain at the foundation of general jurisprudence, yet their clear ascertainment, and embodiment in a scientific form, have been comparatively recent. Within the last half century, great and important advancements have been made in a knowledge of them, and their application to the practical affairs of life. The wants and requisitions of society, in regard to this knowledge, have been furnishing a constant stimulus to the human mind, and inciting it to continued effort in discovering new principles, as well as defining, elucidating, and applying, those that were old.

The demand of the public, in this respect, is sufficiently evidenced in the multiplication of the means of instruction, that is every where taking place. No medical institution in this country or Europe, could now deem its organization complete, without a department devoted exclusively to an exposition of the facts and principles embraced in Medical Jurisprudence.

An experience of some eleven years in teaching in this department, together with a knowledge of the wants of the legal and medical professions in regard to it, have led to the compilation of the work now offered to the public. It does not propose to add new heads, or general topics, for discussion ; to deal in original disquisitions, upon doubtful or unsettled principles ; or to offer mere novelties to those in pursuit of knowledge on its various subjects. The objects chiefly had in view, have been, a methodical, systematic arrangement of the topics legitimately embraced in the department ; and in the treatment of each, a condensation of the knowledge now possessed ; and an exhibition of it in a clear, natural, and logical order, together with such illustrations as were deemed necessary to make an application of the principles to practice. In the selection, and narration of cases, both multiplication, and minuteness of detail, have been equally avoided ; the object being simply to illustrate, and facilitate the reduction to practice, of the principles embraced in them. By adopting this course, I am enabled, within the compass of a single volume, to state in concise terms, all, or nearly all, the ascertained facts and well settled principles that are important to be known, with a brief statement of the cases that serve to illustrate them ; making, at the same time, a reference to the sources from which they were obtained, and where also a greater number of cases, and more minute details of each may be found.

The materials of the work have been derived from many different sources. Without presuming to enumerate all, I acknowledge myself particularly indebted to *Dr. Beck's Elements of Medical Jurisprudence*, *Dr. Guy's Principles of Forensic Medicine*, *Mr. Taylor's Medical Jurisprudence*, *Dr. Smith's Principles of Forensic Medicine*, *Paris and Fonblanque's Medical Jurisprudence;* and on single topics, *Dr. Montgomery's exposition of the Signs and Symptoms of Pregnancy*, *Dr. Watson on Homicide*, *Dr. Kennedy on Pregnancy and Auscultation*, *Dr. Kay on Asphyxia*, *Dr. Christison on Poisons*, *Dr. Prichard on the Different Forms of Insanity*, *Dr. Combe on Mental Derangement*, and *Dr. Ray on the Medical Jurisprudence of Insanity*.

I have been careful as far as possible, in all cases, to make a distinct reference to the source from which the fact, principle, or case stated has been derived. I have done this in the hope, not only of possessing the reader with the principle, and a brief outline of the case which illustrates it, but also, at the same time, of placing before him such references as will enable him to make fuller investigations in regard to any point or principle he may be interested in studying. It is not, therefore, the exclusive design of this work, to supersede other and more voluminous works on the subjects embraced in it; but to furnish, in as intelligible and concise a form as possible, the substance of what they contain, with references to them for fuller discussions, and minuter details of cases. At the same time, it aims to be sufficiently full and minute in its exposition of facts, principles and illustrations, to possess the mind with such an amount of knowledge as may be necessary for all the general purposes for which it may be required.

ALBANY, *May*, 1850.

MEDICAL JURISPRUDENCE.

MEDICAL JURISPRUDENCE.

Medical Jurisprudence is that science which teaches the application of the practice and principles of Medicine to the elucidation and settlement of doubtful questions arising for investigation in courts of law.

This science, unlike many others, admits of no clear logical arrangement of the topics which compose it. It is not itself a complete whole, to the production of which all the several parts conspire in a natural order. It consists of many different subjects or topics, mostly isolated, and having with each other few if any intimate connexions. It is, however, a matter of convenience to bring together those subjects that are at all related to each other; and with that view I propose to follow out, as nearly as possible, the following arrangement, which appears less exceptionable than any that has come under my notice.

All the subjects are included under five general heads or classes.

The First Class will include questions arising out of the relations of sex.

Under this head or class will be comprised,

I. Impotence and sterility.
II. Hermaphrodites, doubtful sex, monsters.
III. Rape.
IV. Pregnancy—its signs and indications.
V. Legitimacy.
VI. Delivery.

The Second Class will include questions arising out of injuries inflicted upon the organization.

This will embrace,

I. Infanticide.
II. Wounds.
III. Poisons.
IV. Persons found dead.

The Third Class includes questions arising out of diseases, or affections in the nature of disease, that disqualify both from exercising rights and performing duties, being principally insanity, including all the different forms of mental alienation.

The Fourth Class includes questions arising out of deceptive practices or pretended disqualifications, principally feigned diseases.

The Fifth Class will include miscellaneous questions, such as age, identity, presumption of survivorship, life assurance and medical evidence.

CLASS I.

QUESTIONS ARISING OUT OF THE RELATIONS OF SEX.

The harmonious movements of general society depend much upon the proper regulation of the relations growing out of the distinction of sex. It is these that lay at the foundation of the domestic relations, which are among the first to which we are subject, and the last from which we are exempted; and are, perhaps, more than all others, replete with sources of happiness, or means of misery. It is, therefore, that questions arising out of these relations, have attached to them a deep degree of interest, and demand a free investigation and discussion notwithstanding the great delicacy with which they are very properly regarded by the popular mind. Among these questions the first we shall notice has reference to,

I. IMPOTENCE AND STERILITY.

These are usually coupled together, and in one respect have a necessary connexion, inasmuch as the existence of the first is always attended by the second as a natural consequence. By Impotence is meant physical incapacity; an inability, from defective organization, or some other cause, to perform the generative act.

Sterility may admit the physical capacity, but leaves the act unattended with any fruitful result. In this view of it, the first is the most generally applicable to the male, the last to the female—although both may be applicable to each.

The question of sterility, apart from impotence, is seldom or never raised in our courts of law. It is not clear, that in the female there is any means of deciding the question of sterility, except as it forms a part of the question of impotence.

Questions of impotence may arise in three kinds of legal investigations:

1. In suits for divorce:
2. In accusations of rape :
3. In cases of contested legitimacy.

In regard to the first, the law of England (1 *Blackstone's Com.*, 440,) admitted impotence as a sufficient cause for an entire divorce, or one a vinculo matrimonii, provided it existed before marriage. But if it arose subsequently, it was no such cause. Marriage being regarded as a civil contract, having in view the birth and rearing up of children as one of its principal ends, if the incapacity existed previous to its formation, it was of such importance as to be deemed an element of fraud, and hence was sufficient to vacate it. If, on the contrary, it did not arise until subsequently, it could not affect the contract, which was valid and therefore binding in its inception, and one of the ends of marriage, the procreation of children, may have been answered. This doctrine will be found illustrated and applied, in the cases of *Briggs* vs. *Morgan*, 3 *Phillimore's Ecclesiastical Reports*, 425 ; *Greenstreet* vs. *Cumyns*, 2 *Phillimore*, 10 ; *Norton* vs. *Seton*, 3 *Phillimore*, 147 ; *Brown* vs. *Brown*, 1 *Haggard's Ecclesiastical Reports*, 523 ; and *Pollard* vs. *Wybourn*, 1 *Haggard*, 725.

The ecclesiastical law of England having never been adopted in this country, it is here pretty generally a matter of statute regulation. In this State, the *Revised Statutes*, 2 *vol.*, 142–3, *of* 1*st edition*, provides that a marriage contract may be declared void for physical incompetency in either of the parties, which existed at the time of the marriage. This proceeding can only be had by the injured party, against the other whose incapacity is alleged, and must, in all cases, be instituted within two years from the time of the marriage.

A judicial construction has been put upon this part of the section of our statute, in the case of *Devanbagh* vs. *Devanbagh*, reported in 5 *Paige*, 554; and also in 6 *Paige*, 175. This was a case in which an unusually firm, dense and strong hymen presented an insurmountable obstacle to the consummation of the marriage.

The principles settled in that case, were substantially the following: That if there existed the probability of a physical capacity, the court cannot annul the marriage contract; that the impotence must exist at the time of the marriage, and must be incurable; that the party must submit to a surgical examination, if necessary, to determine the fact of impotence; and that if a slight surgical operation can restore the competency, it must be done, or that a divorce cannot be decreed because it is not done.

An act was passed in Pennsylvania in 1815, providing that if either party, at the time of the contract, was and still is naturally impotent, or incapable of procreation, it shall and may be lawful for the injured and innocent person to obtain a divorce.

Impotence, if established at the time of the commission of the alleged offence, would be a sufficient defence on an indictment for rape. So, also, in contested questions of legitimacy, the fact of impotence existing at the period of conception of the claimant, would be controlling. The examination, therefore, the most generally has to be made, not only as to the fact of impotence, but also as to whether it did or did not exist at a particular time.

Impotence may exist both in the male and female. It may be either *absolute* or *relative*. In the first, there is a total incapacity; in the second, the incapacity exists only as between particular parties. Again, impotence may be either *organic* or *functional*, according as it is produced by *physical* or *moral* causes. Questions relative to impotence, seldom arise for investigation, unless it is *absolute* and *organic*, arising from *physical* causes.

The three conditions essential to the full and perfect exercise of the physical capacity, is erection, intromission and ejaculation of the seminal fluid. The first and third of these belong exclusively to the male, the second to the female. A fatal defect in one or more of these, must necessarily result in impotence. *Ryan's Medical Jurisprudence*, 99.

The physical causes of impotence in the male, or those that are generally productive of it, are—1. Age; 2. Defect or malformation of the penis; 3. Defect or disease of the testicles; 4. Constitutional disease or debility.

1. *Age:* Youth and old age are equally incapacitated. Prior to the seminal secretion, that is, before the age of puberty, sexual intercourse is either entirely impossible, or certainly as to any productive result. The age at which this occurs, varies with the climate, the food eaten, and mode of life, and probably with the constitutional peculiarities of the individual.

Any judgment formed in relation to it, must rest mainly on the general conformation of the body, the character of the voice, the growth of the hair, the development of the organs of generation, and the constitutional indications, hereafter mentioned. The young and old have been termed the frozen zones of existence, the intermediate being the torrid zone. Impotence grows out of the infirmity of age as well as the immaturity of childhood. But at what particular age it supervenes it is impossible to settle upon. It may perhaps be stated as a general rule that the capacity in the male exists from puberty to the 65th year, but there are so many differences in individual condition as to render any rule that may be laid down of little or no value. In some men the capacity exists to a remote age. Haller pronounces a man of ninety possessed of the capacity. The celebrated Thomas Parr, who outlived nine kings of England, became a father in his one hundred and fortieth year.

Impotence, from age, became a question in the celebrated Banbury Peerage case, which came before the house of Lords in the year 1813. It was there insisted that the ancestor of the claimant could not have been the son of Lord Banbury, because that nobleman was eighty years of age when the child was born. It was, however, clearly recognized in that case, that the law of

England admits of no age at which a man may not become a father.

It may, therefore, be considered as settled, that neither law nor science can assign any period in the life of man, when the power of procreation ceases. Each case must be determined upon the circumstances it presents.

2. *Defect or malformation of the penis:*

The entire want of it would produce impotence. When a part remains, it may be difficult to tell, in any given case, whether the physical capacity does or does not exist. The principle deduced from the great number of cases that have occurred seems to be pretty clearly settled, that if sufficient of it remains to admit of introduction within the orifice of the vagina, and there be no impediment to the emission of semen, a fruitful intercourse may take place: *Guy's Principles of Forensic Medicine*, 54. Several instances have occurred where the glans has been lost, and yet the faculty of procreation has been retained: 1 *Paris & Fonblanque's Medical Jurisprudence*, 202.

One case is related, where both the corpora cavernosa were destroyed; but as the urethral canal was preserved, it did not result in impotence. In another case, a musket shot carried away so considerable a portion of the penis, that when the wound healed, the organ remained curved; and yet it proved adequate to the performance of its functions. Even where, in consequence of disease followed by amputation, there was only a very small protrusion of the organ on pressure, the patient afterwards became the father of two children. *Guy's Principles of Forensic Medicine*, 54.

Although not a frequent occurrence, yet there may be a paralysis of the muscles of the penis, so as to render it incapable of performing its function. So, also, a continued erection may occasion a temporary impotence; the vigor of the erection so closely shutting up the urethra, as that the powers which throw the semen from the vesiculæ seminales, are unable to overcome it. 1 *Paris & Fonblanque's Medical Jurisprudence*, 205.

There may exist a contracted state of the prepuce or a Phymosis, which may so interfere with the discharge of the semen as to constitute impotence; but as this is capable of being removed by an operation, it cannot be considered as a permanent cause. 1 *Paris & Fonblanque's Med. Juris.*, 204.

Size of organ, when much below or above the natural ordinary size, has been considered by some as a cause of impotence. Under this head, a very extraordinary case is related by Mr. Wilson, which should induce a great degree of caution in pronouncing upon impotence from this cause. 1 *Beck's Medical Jurisprudence*, 75.

He says he was consulted by a gentleman as to the propriety of his entering the marriage state, as his penis and testicles very little exceeded in size those of a youth of eight years of age. He was then twenty-six, and had never felt desire for sexual intercourse until he became acquainted with his intended wife, since which, he had experienced repeated erections, attended with nocturnal emissions. He married, became the father of a family, and those organs which, at twenty-six, were so much smaller than usual, at twenty-eight, had increased nearly to the usual size of those of an adult man. Excessive development can scarcely be regarded as a cause of impotence, as it can rarely, if ever, go to the extent to render impregnation impossible. *Guy's Principles of Forensic Medicine*, 54.

Under the same head is also to be included malformation arising from the unnatural situation of the orifice of the urethra. Sometimes it opens in the perinæum, occasionally on the dorsum or back of the penis, and more frequently underneath. 1 *Paris & Fonblanque*, 203. This is termed *hypospadia*, and in determining the question in any given case, it will be necessary to ascertain whether the orifice of the urethra is situated in that portion of the penis which would be introduced into the vagina in the act of intercourse. If so, under the principle already mentioned, the party cannot be termed impotent.

There are a great number of well authenticated cases in which the orifice of the urethra was situated upon the penis, where not only the physical capacity fully existed, but where the peculiarity itself has been transmitted to offspring. See *Guy*, 55; 1 *Beck*, 71, and number of cases collected in a note.

A much more difficult case to decide is where the urethra opens in the perineum. Dr. John Hunter, in a case of this kind, accomplished the purpose of impregnation by causing the semen to be injected by means of a syringe, previously warmed, into the vagina, immediately after the act of intercourse, and during the existence of the venereal orgasm. 1 *Paris & Fonblanque*, 203. This certainly shows that great caution should be practiced before pronouncing a party impotent from the malformation arising from the termination of the urethral canal.

Instances of impregnation have occurred where the hymen remained unbroken, and also where the male organ was not suffered to enter the vagina at all, in which latter cases it is supposed it must have taken place from the mere deposition of the semen upon the vulva. *Guy's Medical Jurisprudence*, 56, *and authorities there cited.*

3. *Defect or disease of the testicle:*

There was once a period in the history of physiology when the testicles were not considered as necessary to virility. From observing that the bull could impregnate the female after castration, Aristotle abandoned the true theory of the function of the testicles, and asserted their use to be to serve as weights to hinder the spermatic vessels from being folded up. 1 *Paris & Fonblanque*, 197–8. Notwithstanding, however, the authority of the Stagirite to the contrary, they are now regarded as essential to constitute virility. It is true, nevertheless, that their removal in a healthy state, after puberty, is not immediately productive of impotence. The instance of the bull above mentioned is a case in point. There is little doubt but that sexual intercourse may take place for a considerable period of time after the removal of both testicles. Sir Astley Cooper mentions a case in which a party for twelve months after the loss of the second testicle, had sexual intercourse accompanied with emissions, afterwards intercourse without emission, which became less frequent until the expiration of about ten years, when both ceased. *Guy's Principles of Forensic Medicine*, 56.

Other instances are also mentioned, going to show that in such cases the capacity may exist after castration, for a longer or shorter period, depending probably somewhat upon the circumstances, and the age and constitutional strength of the party. The loss of both testicles before puberty, would occasion impotence. Their loss subsequently would occasion it; but the question of time would here occur, which might be one of doubt and difficulty.

As impregnation can be but little dependent upon the quantity of semen introduced into the vagina, it may now be considered as well settled that one testicle, if in a healthy state, may be sufficient for all the purposes of effecting it. *Guy's Med. Juris.*, 56.

Another difficulty that sometimes presents itself is, that no testicles are to be found in the scrotum. In such case the first thing to be determined is, whether they have been removed. If such be the fact, and their removal has been accomplished by excision, this will be indicated by the cicatrices that remain. If no cicatrices are found, the next thing to determine is whether they have descended from the abdomen. They are formed in the cavity of the abdomen, where they remain until the sixth month, after which usually they gradually descend towards the abdominal ring, through which they generally pass into the scrotum before birth. Sometimes the descent does not take place until a late period, and in a few instances they remain in the cavity of the abdomen during life. The effect this may have upon the generative power has been formerly a matter of some dispute, but it may now be regarded as well settled, that provided they are well developed, and in a healthy condition, their situation in the abdomen, or in the inguinal canal, in which they are sometimes found, does not divest them of the power of performing their functions. If, therefore, the testicles are to be found neither in the groin nor in the scrotum, and no cicatrix indicates their excision, a resort must be had to the general appearance of the body, sound of the voice, growth of the hair and other indications of virility, to determine whether or not the capacity exists.

There are also diseases which affect the testicles, some causing a wasting of their structure, others changing their texture: such, for instance, are the elephantiasis and cynanche parotidea. *Guy's Med. Juris.*, 57.

So, also, after severe inflammatory action, they may be absorbed by an operation of nature. A severe bruise of the testicles has resulted in their absorption, and thus been productive of impotence. Chronic inflammation, from any cause, may result in impotence. Cases are sometimes met with, of arrest of development of the testicles, where in the adult they are no larger than they are ordinarily found to be in a boy of six or seven years of age. Where the process of wasting does not arise from disease of the gland, the testes usually preserve their shape, but feel soft, having lost their elasticity and firmness.

Any organic disease of the testicles, such as schirrhus, medullary sarcoma, &c., will be likely to cause impotence, provided the entire structure of both testicles is affected. There may also exist mechanical causes, such as congenital scrotal hernia, which by pressure upon the spermatic vessels, may prevent the secretion of semen, and thus be productive of impotence.

The observations of Baron Larry, as quoted in the *Medico-Chirurgical Review for July*, 1831, (*see vol.* 19, *p.* 15, 16, 17, &c.,) go to show a most intimate connection between the cerebellum and genital organs. Wounds in the cerebellum, or occipital region of the head, have been found to cause an atrophy in the organs of generation, so far as to render the party impotent. On the other hand, wounds in the genital organs, were found by him to exert a reciprocal influence in the production of atrophy in the cerebellum and occipital region of the head.

Instances may occur, in which the structure of the testicle is defective. One instance is given by John Hunter, in which the epydidymis, instead of passing to a vas deferens, terminated in a cul-de-sac. This anomalous structure would prevent the evacuation of the semen by the urethra, and thus render the party impotent or sterile. 1 *Paris & Fonblanque's Med. Juris.*, 201. Sometimes a similar difficulty occurs in the vesiculæ seminales, which, instead of entering the urethra, terminate, after being joined by the vasa deferentia, in imperforated pouches, or cul-de-sacs, producing incurable impotence. *Ib.*, 202.

4. *Constitutional disease, or debility:*

There are many diseases which interfere with the generative function. These are generally remarked to be of that character that affect the head and sensitive system primarily, and those which are accompanied with great debility. Such, for instance, are imflammatory and catarrhal fevers. On the other hand, there are some diseases that appear actually to stimulate the genital organs. Such are gout and rheumatism, calculus of the kidneys and bladder, and sometimes during convalescence, from yellow and other fevers. *Guy's Principles of Forensic Med.*, 59; 1 *Beck's Med. Juris.*, 79.

The following are enumerated among the injuries and diseases which, from the changes they produce in the system, are extremely likely to produce impotence: "A mutilation, or severe wounds of the sexual organs, carcinoma of the testicles or penis, gangrene of the lower extremities, immoderate evacuations of blood or bile, or of the fœces, scorbutic cachexia, marasmus, peripneumony and hydrothorax, anasarca in its perfect state, (particularly if accompanied with an infiltration into the sexual organs,) nervous and malignant fevers, (particularly if they affect the brain, and are accompanied with great debility and loss of memory,) all affections of the head and spinal marrow, whether from a fall, blow, wound, or poison, or from internal causes, as apoplexy, palsy, or other comatose diseases. So, also, if affected with leprosy, venereal ozœna, severe cutaneous diseases, or insanity, a reasonable doubt of the fact of cohabitation may be entertained, from the fear the female may be presumed to experience lest she should be contaminated, or from the dread entertained of having communication with the individual. 1 *Beck's Med. Juris.*, 80-81.

A habitude of chastity, too long indulged in, may in time extinguish the desire, and impair or destroy the power of erection. In such cases, the organs decay, like all other corporeal organs, whose functions are not exerted. *Ryan's Med. Juris.*, 101.

So, also, a habitude of indulgence, long continued, and excessive, whether with women or by masturbation, produces the same, or, rather, a much worse result. The state or condition to which this leads, is accompanied by involuntary discharges of semen, which, of itself, occasions great debility, and difficulty or impossibility of exciting the turgescence of the penis. Dr. Ryan attributes to this excessive indulgence, the fact, often occurring, of want of family in young married persons. *Ryan's Med. Juris.*, 102.

The abuses of narcotics, saline refrigerants, acids, acid fruits, iodine, camphor, and nitre, are enumerated by Dr. Ryan among the causes of impotence. *Ib.*, 102.

Some facts would seem to show that there may be some diseases which so change the state of the system, as to produce an alteration in the generative power. Thus Avenzoar had no children during the period of his youth, but became a father shortly after recovering from a violent fever. There was also an artificer who lived twenty-four years with his wife without issue. Shortly after convalescing from illness he became a father and subsequently had many children.

Where impotence arises from the operation of causes developing themselves through the constitution of the individual, the following are described as the most frequently attending concomitants. The hair is white, fair and thin. There is no beard. The countenance is pale. The flesh is soft and without hair. The voice is clear, sharp, and piercing. The eyes appear dull and sorrowful. The form is round, shoulders strait, and perspiration acid. The testicles are small, withered, pendulous and soft. The spermatic cords are small, the scrotum flaccid, and the gland of the testicles insensible. There is no capillary growth on the pubes. A moral apathy prevails, and great pusillanimity and fear is present on the least occasion. These are the usual indications of impotence or sterility in the male. *Ryan*, 101.

The mental or moral causes of impotence have their operation upon the mind; and by means of the effect they produce there, render the genital organs unfit for the exercise of their functions. They operate only upon the mind of the male, and usually attack one condition essential to the generative act, namely, that of erection.

The moral causes of impotence are any excessive passion, extreme timidity, alarm or apprehension, disgust, or any other strong working of the imagination, prevailing at the time. The principle seems to be—the prevalence at the time of any one absorbing emotion, or other intense action of the mind, the effect of which is to withdraw the system from the influences and power to which it is subjected in order to the performance of the act. There is perhaps no fact in the animal economy, that demonstrates more clearly the influence and power of the moral over the physical state of man, than is to be found in the operation of these moral causes. Any ruling idea that for the time absorbs the mind by concentrating upon itself all the mental energy, deprives the organization of the use of that mental element without which the phenomenon of erection is never experienced. *Guy*, 60; *Ryan*, 102–3; *Smith's Forensic Med.*, 56–7.

One of the most frequent of these causes is the fear itself of being impotent. This has frequently operated to produce this effect. When the moral state had consumed their desires, or substituted other emotions in their place, men supposed there was no physical power, and they were impotent so long as they supposed themselves so. It was in the operation of these moral causes that the powers of magic and witchcraft, the ingenious charms and amulets that have been invented, have been enabled to produce such successful results. Thus a few obscure and unintelligible words written on paper with the blood of a bat, sowed up with a needle which had been used in making shrouds for the dead, and tied around the neck of a new married man, has produced impotence from a moral cause. *Ryan* 103. So also among the Athenians, an unsuccessful suitor, on the marriage of his rival, by tying the locks of his hair, with a certain form of words, had the power of deferring the bridegroom's happiness just as many nights as he tied locks of hair. *Smith's Forensic Medicine*, 457. It is related that an Archon suffered this calamity during the first month of his marriage. These moral causes can seldom arise for investigation in courts of justice, as they are generally curable, being temporary in their nature.

There seems, however, to have been one moral cause of a permanent character, and that is aversion. In the case of the Earl of Essex, reported in 1 *Hargrave's State Trials*, 315: See also

1 *Beck*, 69, *and Smith* 489 : the Earl admitted his inability to know the Countess of Essex, but denied his impotence as to other females. So also in a case quoted by *Guy*, *page* 60, the husband was incapable of emission while cohabiting with his wife, although there was no physical obstacle to prevent it, and the same difficulty was not experienced with other persons, and he had had children by a former marriage.

The following have been enumerated among the curable causes of impotence. "An atony of the parts, arising sometimes from local disease or external injury, and at others from masturbation ; a retraction of the penis, originating from stone in the bladder, or some other urinary disease, a natural phymosis, which sometimes confines the glans in such a manner as to prevent the emission of semen ; obliteration of the canal of the uretha, from stricture or other causes ; and a malconformation as to the place of the aperture of the urethal canal. These have all been successfully obviated by modern surgery. 1 *Beck* 76–7.

There are several causes of impotence in the female, mostly affecting the second condition, viz : intromission. Some of these causes are incurable and some curable. Among the incurable, are reckoned an obliteration or thickening of the sexual organs so as to prevent any intromission. Thus the vagina and womb have been found closed with a dense fleshy substance, see 1 *Beck*, 81, *et seq*; the vagina has been found entirely wanting, while the uterus has been present. There may be either a natural or fistulous communication of the vagina with the bladder or rectum. A prolapsus or retroversion of the uterus, or a prolapsus of the vagina, although curable in their first stages, may, after a long standing, become incapable of reduction, and thus incurable. A cancer of the vagina or uterus from the extreme pain that accompanies it, becomes an absolute cause. There are also some cases on record of such extreme brevity of the vagina as to render the female sterile, if not impotent.

Among the curable causes of impotence in the female are, a dense fleshy substance covering the orifice of the vagina. This substance is most commonly the hymen, preternaturally enlarged and thickened.

This constituted the difficulty in the case of *Devanbagh* vs. *Devanbagh*, reported in *5th and 6th Paige*, before referred to. This, however, cannot be considered a complete cause of impotence, as conception has actually taken place, notwithstanding the obstacle interposed by it. 1 *Beck's Med. Juris.*, 85.

There may also exist extreme narrowness of the vagina, which is congenital. This may be removed by the use of emollients, and careful dilatation, as the cause first mentioned may by a surgical operation. The occurrence of tumors and callosities, cicatrices remaining after the cure of ulcers, the result of lacerations after difficult labor, with other accidental causes, may also originate nearly the same difficulty in the vagina, which may be cured by the same means.

In the adult female, adhesion of the labia sometimes takes place as the result of inflammation, or from neglect of accidental excoriation. Even hard labor has sometimes given rise to preternatural union of the labia. 1 *Paris & Fonblanque*, 206.

In children, the labia are sometimes found adhering together, leaving but a small passage for the discharge of urine. In whatever way the adhesion may be produced, it is easily curable by a slight surgical operation.

Dr. Ryan arranges all the causes of impotence and sterility in females, under three classes. *Ryan's Med. Juris.*, 106.

1. Those depending on the organs which receive the male fluid, viz., the genital fissure, the vagina, and the uterus. The difficulties to which these organs are subject, and the impediments usually found in the way of their exercising their functions, have already been considered.

2. Malformation, or diseases of the organs that transmit that fluid to the ovaries, and re-convey the embryo to the uterus. These are the fallopian or uterine tubes. These may have been, originally, defective in structure, as they have been found without any aperture; or the fimbriated extremity terminating in a cul-de-sac; or they may have become so obliterated in consequence of peritoneal inflammation, as to lose the power of conveying the ovum from the ovarium to the uterus. In some courtesans, they have become entirely obliterated by the thickening

of their parieties, a consequence of the habitual orgasm in which they have been kept by too frequent excitements.

3. Malformation, or diseases of the ovaries or organs which supply the germ for fecundation. *Paris & Fonblanque*, 214.

Instances of diseased ovaria are very common, and may arise from a great variety of causes. 1 *Paris & Fonblanque*, 214. Inflammation, ulceration, scirrhus, cancer, ossification, calcareous deposit, or tumors in any of these organs, may be the cause of sterility. *Ryan*, 106.

Sterility is generally considered as confined to the female. The result of impotence is that the subject of it is also sterile. Sterility alone is seldom a matter of enquiry in courts of law. It may result from constitutional debility, leucorrhœa or excess or deficiency of the menstrual discharge. Sterility is most frequently attended with corpulency; this latter arising either from weakness of the system, or from want of activity in the ovaria. Spayed or castrated animals generally become fat. 1 *Paris & Fonblanque's Med. Juris.*, 215.

So also there may be exhaustion of the uterine system, arising from the practice of too frequent or promiscuous intercourse. Prostitutes seldom conceive; and young married people, strong, healthy and vigorous, sometimes remain for years without children. *Ibid*, 215; *Ryan*, 108.

There are also other causes of sterility that are little understood, as the fact not unfrequently witnessed of females remaining sterile for a number of years, and then again becoming fruitful, and also of those who are sterile with one husband becoming fruitful with another. 1 *Paris & Fonblanque*, 215.

From a review of the whole subject of impotence and sterility, it will be probably a safe conclusion, that the causes of impotence in either sex are few in number; that these are physical causes; that they mostly consist of permanent malformations, or accidental lesions, evident to the senses; and that they are those that art cannot remedy.

Whenever examinations become necessary to be made, the age, general appearance, habit of body, and state of health, should be noted, and also the diseases with which the individual may have been previously afflicted. The sexual parts should undergo a careful examination; the urethra of the male should be sounded, and the state of the prostate gland ascertained. The object will be to determine the physical causes of impotence, and also the length of time during which they have existed. *Guy*, 61–2.

II. HERMAPHRODITES—DOUBTFUL SEX—MONSTERS.

Inquiries into the subject of Hermaphroditism have occupied some part of the attention of medical jurists, and have found a place in works on medical jurisprudence. The necessity of having an intimate knowledge of it, will depend much upon the laws under which the people live, especially those which regulate the descent of property. Where, for instance, the law of primogeniture prevails, and the preference is given to males, as in England, it becomes important to determine the question of sex, in order to regulate the descent of property, or to decide upon its ownership. Here, therefore, it becomes necessary to determine the sex with accuracy; and this subject will have, therefore, attached to it, a great degree of importance.

In a country like the United States, where institutions are more democratic, where males and females are regarded alike in the descent of property; where estates are fettered by no entails, and the husband's tenancy by the curtesy, has no dependance on the fact of whether his offspring be a male or female, the subject is comparatively of much less moment. Rightly considered, it is a branch of the great subject of impotence and sterility, as one or both generally result from any very great peculiarities in the formation of sex.

Hermaphroditism, strictly, means the union of both sexes in the same individual; the possession in one of the qualities of each, so as to perform the functions of both. This is now clearly recognized as an impossibility. So far is it from realization in actual fact, that in most or all those cases termed hermaphrodites, there exists the incapacity of exercising the functions of either.

Several cases of what are termed hermaphrodites, are collected by Dr. Beck, in his chapter on doubtful sex. 1 *Beck's Medical Jurisprudence*, 94. As this may legally be regarded, in this country, a subject of minor importance, I will merely state some general conclusions derived from the cases that have thus far occurred, without entering into any statement of the cases themselves.

The causes that lead to sexual peculiarities so abnormal as to create doubt in regard to the real sex of the individual, are of difficult or impossible investigation. They may arise from the arrested development of the organs during the growth of the fœtus. *Taylor's Medical Jurisprudence*, 495. From whatever causes arising, they may, perhaps, all be included in some one of the three following classes.

1. Male individuals with such unusual formations of the generative organs as, in many respects, to resemble the female.

2. Female individuals with such unusual formations of the same organs as to resemble the male.

3. Where a mixture of the sexual organs of both sexes is exhibited, without either being entire. *Guy's Medical Jurisprudence*, 43.

1. The first are called *Androgyni*. In these cases the ambiguity very frequently consists in the testes being contained in separate parallel folds of the skin; in an imperforate penis, and in the urethra opening in the perinæum, on the surface of a blind aperture, having a red and tender appearance, so much so as to be mistaken for the vagina. 1 *Beck's Medical Jurisprudence*, 100.

The penis is here considered an enlarged clitoris; the folds of the skin containing the testes, the female labia; and the termination of the urethra, the vagina. 1 *Beck's Medical Jurisprudence*, 101. This class of individuals may have the testes and vesiculæ seminales perfect; but the imperforate penis, and the opening of the ejaculatory ducts near or in the perinæum, must render them impotent. The strong muscular development, tone of voice, tastes and habits possessed, indicate the masculine rather than the feminine gender. There are, however, not wanting cases in which there is an enlargement of the breasts, and a preference manifested for the society of the male. *Guy's Medical Juris.*, 44.

A confinement of the penis to the scrotum, by a particular formation of the integuments, has occasioned the individual to be called an hermaphrodite. In such case a slight incision liberates the restricted parts, and, if the penis is well formed, restores the competency. 1 *Beck's Med. Juris.*, 101 ; *Guy's Med. Juris.*, 44.

2. The second class mentioned are called *Androgynæ.* One peculiarity, occurring probably the most frequently in this class, is an enlarged clitoris. This is no very unfrequent occurrence in warm climates, but has seldom been found in Europe. 1 *Beck's Med. Juris.*, 193. The clitoris has sometimes been found two inches in length, but has neither prepuce nor perforation, and is therefore easily distinguishable.

The absence of testicles, presence of a vagina and uterus, occurrence of menstruation, either or all proclaim the female sex.

Another malformation belonging to this class is a prolapsus uteri. Several cases are on record of this description, in some of which, the individual claimed to possess the organs of both sexes, and to be able to employ both. On reduction of the prolapsed uterus, the difficulty disappears : 1 *Beck's Med. Juris.* 105. *Guy's Med. Juris.* 45.

3. The third class embraces those cases in which there is a mixture or blending of the sexual organs without either being entire. Several examples of this class have occurred, and on close examination of them, the predominance of one sex over the other is clearly discernable. 1 *Beck's Med. Juris.* 94. The principle which has been deduced from the cases that have occurred is, that in the two sexes there are organs which correspond to each other, and which may be called analogous organs ; the penis to the clitoris, the scrotum to the labia, the testes to the ovaria, and the prostate to the uterus ; and that of these analogous organs, no two were ever found together in the same individual. 1 *Beck's Med. Juris.* 98.

No monster has been described, having both a penis and a clitoris ; nor with a testis and ovarium on the same side—we may venture to say with testes and ovaria ; nor one having a prostate and uterus. 1 *Beck's Med. Juris.* 98 : *Guy's Med. Juris.* 46. An ovary has been found on the left side and a testis on the right, and also a case in which was the reverse of this. Sometimes the external organs have approximated closely to the female type, and the internal to the male. In other cases the reverse of this has occurred. *Guy's Med. Juris.* 46.

In cases of doubt or difficulty the following points are entitled to consideration. The growth of the beard and hair on different parts of the body; the formation of the shoulders and hips; their relative widths; the development of the breasts; the fullness of the thighs; the masculine or feminine character of the voice; the desires excited by the presence of either sex; the presence or absence of the menstrual or vicarious discharges. In the sexual organs are to be noted the organ corresponding to the penis or clitoris, and whether it is perforate or imperforate; the form and mode of attachment of the prepuce; the presence or absence of parts corresponding to the nymphæ; if the labia majora exist, and the presence or absence of the testicles.

Any openings which may be found to exist must be examined with a sound, to ascertain whether they communicate with the bladder or uterus, or are merely culs-de-sac. Examination should also be made in reference to the hymen and the carunculæ myrtiformes. *Guy's Med. Juris.* 46.

An ingenious work on hermaphroditism has been published by M. Geoffry St. Hilaire, a notice of which is to be found in 1 *Beck's Med. Juris.* 108, &c: and *Guy's Med. Juris.* 46–7. He divides the generative apparatus into six different portions or segments, three on a side, which, in several respects, are independent of each other. The first and second are the deep seated organs, testicles and ovaries; third and fourth, the middle organs, womb or prostate, and vesiculæ seminales; the fifth and sixth are the external organs; the penis and scrotum, clitoris and vulva. It is hardly necessary to carry these out into the different classes, as the general result would not, perhaps, be found to be essentially different from what has already been stated.

The occasional, although very unfrequent, occurrence of monstrosities, renders it necessary to advert to the subject of monsters. The common law of England in regard to monsters, which is also applicable in this country, is, that a monster which has not the shape of mankind, but in every part evidently bears the resemblance of the brute creation; has no inheritable blood, and cannot, therefore, inherit, although brought forth in marriage. But although it may have deformity of body, yet if it have the human shape, it is capable of inheriting. 2 *Blackstone's Com.*, 246. This, in most cases, will serve to define the duty of the medical jurist. That duty will simply be, to determine whether the shape, the outward appearance, be human; or whether there is so wide a departure from it, or so great a resemblance to the brute creation, as fairly to exclude it from the human family. In this point of view, the classification of them is of small importance, as it is of little consequence whether they are such by excess, or defect, or by alteration or wrong position of parts; the only use of the classification being to enable the medical jurist to come more satisfactorily to his own conclusions.

Were the occurrence of monsters much more frequent than they are, many puzzling questions would arise for settlement. It would be a matter of extreme difficulty to determine what precise degree of monstrosity should be required to divest the being of his civil rights. There are monsters, for instance, without a head, acephalous,—although such could hardly survive birth. There are others, two-headed, dicephalous; and two-bodied, disomatous. The rule, according to St. Hilaire, (*see Taylor's Med. Juris.*, 483,) is, to consider a dicephalous monster, whether it be disomatous or not, as two beings; and if it have but a single head, under the same circumstances, as one. This rule he grounds upon the performance of the right of baptism in all Christian countries, upon each head, where the monster was dicephalous. There would appear to be as many moral individualities as there are heads. This might give rise to some curious questions in the administration of criminal law. St. Hilaire relates a remarkable case in illustration of this, which he says actually occurred in Paris, in the seventeenth century. A double-headed monster killed a man by stabbing him with a knife. The being was condemned to death, but was not executed on account of the innocence of one of his component halves.

Dicephalous monsters seldom live long after birth. One, however, born in Sardinia in 1829, being double from the head to the pelvis, the left bust being named Christina, and the right, Ritta, lived some nine months from its birth. The Siamese twins, both dicephalous and disomatous, are still living, possessing distinct volitions, but movements simultaneous as if they constituted but a single being. Their separate powers of volition should give each a civil and criminal accountability, and yet no severe punishment could be inflicted upon one without involving the other in the same condemnation.

As the external shape is the governing consideration, no reference is had to the internal conformation. Malformations, transpositions, defects of internal organs, are of little or no consequence in a legal point of view. The law, no doubt for wise purposes, disregards those internal deviations in structure from the ordinary normal state, which can only be revealed by dissection after death.

III. RAPE.

Rape is the having unlawful and carnal knowledge of a woman by force and against her will. This detestable crime both against the individual and against society, has met with a punishment varying in severity among different nations. The laws of different countries in regard to the punishment awarded to this crime, are collected by Dr. Beck, in his chapter upon Rape; 1 *Beck*, 129, *et seq.* As the knowledge of these would contribute but little towards enlightening the medical jurist, in regard to what is demanded of him, I shall omit the consideration of them. It may be well enough barely to remark that the punishment awarded has been either death, or a long term of imprisonment, and in some cases a fine and imprisonment, or both.

In England the punishment for unlawfully and carnally knowing and abusing any female under the age of ten years is a felony, and subjects to the punishment of death. If committed on one above ten and under twelve, it is a misdemeanor and liable to imprisonment.

A person committing the crime upon the high seas, but within the jurisdiction of the United States, and not within that of any particular State, is also deemed guilty of felony, and must suffer the penalty of death. *Lewis' United States Criminal Law*, 557; and 4 *Peters' Stat.* 115.

In the several States considerable diversity prevails. In Massachusetts the punishment is death. In Virginia, New-Hampshire, Connecticut, Maine, New-Jersey, Ohio, Illinois, Michigan, and Tennessee, it is either imprisonment for life or a term of years. The period of ten years is specified. In Vermont, any individual exceeding 15 years of age, abusing any female under 11, either with or without her consent, shall suffer fine and imprisonment. In Indiana, the age of consent in the female is fixed at 12 years, and the punishment imprisonment for a term of years. In Missouri and Arkansas, the punishment for rape under ten years is castration; in Delaware a fine, standing in the pillory one hour, 60 lashes, imprisonment not exceeding two years, and afterwards to be sold as a servant for a term not exceeding 14 years. *Guy's Med. Juris.* 81.

In New-York, the *Revised Statutes*, II. 552, provide that every person who shall be convicted of rape, either

1. By carnally and unlawfully knowing any female child under the age of ten years, or

2. By forcibly ravishing any woman of the age of ten years or upwards, shall be punished by imprisonment in the State prison not less than ten years.

It is also provided that every person who shall have carnal knowledge of any woman, above the age of ten years, without her consent, by administering to her any substance or liquid, which shall produce such stupor, or such imbecility of mind, or weakness of body, as to prevent effectual resistance, shall, upon conviction, be punished by imprisonment in a State prison not exceeding five years.

Thus it will be seen that the punishment awarded for the commission of this crime, although varying in different countries, is in each of them severe. In England, and some of the northern states of the Union, a male under the age of fourteen years is presumed physically incapable of committing the crime, and hence no indictment can be sustained against him. In Ohio the prima facie presumption is the same, but that presumption may be rebutted by proof, that he has arrived at the age of puberty, and is physically competent to commit the crime. *Lewis' United States Criminal Law*, 565–6. A female is presumed incapable of consent while under the age of ten years, so that no force is necessary to be proved in any such case. All present aiding and assisting in the commission of this crime are principal offenders in the second degree. *Lewis' United States Criminal Law*, 558.

In the case of Lord Caslehaven : 1 *St. Tri.* 387 : it was decided that a husband might be convicted of a rape upon his own wife, by assisting another person to violate her. Penetration and emission seem to be necessary to constitute the crime of rape, but after several conflicting decisions in the English courts, the one has come to be regarded as prima facie evidence of the other, and the question of emission is a fact for the jury. In New-York the proof of actual penetration into the body is all the statute requires. 2 *R. S.* 820, § 18. In Illinois, Indiana, Tennessee, Pennsylvania and South Carolina, and probably in most of the other States this is sufficient. *Guy's Med Juris.* 81.

It has been once decided in this State, that force was not necessary for the commission of a rape, but that stratagem might supply its place. *Note* 1, *Wh. C. C.* 381. In the case of *The People* vs. *Abbott*, 19, *Wendell*, 192 ; it was held that the prosecutrix was not privileged from answering questions asked her relative to her previous illicit connexion with the defendant or with others. That it may also be shown that she is a common prostitute, this fact, if true, tending to repel the allegation of force, and laying a foundation for inferring assent on her part.

It was also held in this case that the evidence should not be limited to the general character of the witness for truth and veracity ; but that proof might also be introduced against her general moral character ; and that particular acts and associations indicating a want of chastity may be shown. In the case of *The People vs. Hulse*, 3 *Hill*, 318, the court by *Bronson*, *Justice*, after showing the extreme probability that some force may have been used sufficient to overcome a resistance so feebly exerted as to have invited, rather than discouraged the continuance of it ; and then subsequently the operation of some powerful motive may have induced the woman to call that a rape which in truth was an offence of a much less odious character, proceed to say that in cases of this character, courts and juries cannot be too cautious in scrutinizing the testimony of the complaining witness, and in guarding themselves against the influence of those indignant feelings which are so naturally excited by the enormity of the alleged offence. That there is much greater danger that injustice may be done to the offender in cases of this kind, than there is in prosecutions of any other character.

The crime of rape may be committed upon a virgin, a single or married woman, or even upon a prostitute. The latter being also under the protection of the law.

The circumstances, therefore, are very greatly multipled, under which the medical jurist is required to make his examination and give his testimony. As the person injured is the witness and sometimes the only one, a great many assignable motives may operate upon her mind to make that out a crime in another which will exonerate her from all personal blame. This, says Sir Matthew Hale, is an accusation easy to be made, and harder to be proved, but harder to be defended by the party accused, though innocent.

The two main facts to be made out on an indictment for a rape are — 1. Forcible penetration: 2. In case of females over ten years of age, that the force used was against the will of the injured party. It is principally in proving or disproving the first, that the testimony of medical witnesses is required. In this enquiry the main points to which the attention is to be directed are the following:

1. What are the marks of violence, if any, discoverable in the organs themselves?
2. What marks or indications of actual violence upon the persons, either of the prosecutrix or prisoner?
3. What marks or spots of blood, or stains caused by the spermatic fluid, on the clothes of the prosecutrix or prisoner?
4. What evidence of the existence of gonorrhea or siphilis in one or both the parties?

5. The relative age, strength, constitution, habits, situation, circumstances, mental powers and propensities of both the prosecutrix and prisoner.

6. The consideration of some medico-legal questions bearing directly upon the facts in dispute. Each one of these will require a brief attention.

1. The marks of violence in or upon the organs. In case the injured party is young, and has never been married, the question will probably arise as to what are the physical signs of virginity, and what degree of confidence is to be attached to their presence or absence. Among these physical signs are to be ranked,

1. *The Hymen.* There are a number of respectable authorities both for and against the existence of the hymen. It is somewhat varied in its appearance in different females, and this may have led to some misapprehension. It is usually exhibited in the form of a semi-lunar fold, bounding the entrance of the vagina below; the extremities losing themselves behind the labia minora in the circumference of the aperture of the vagina; its concavity being behind and its convexity before. *Guy's Med. Juris.*, 66–7.

Sometimes it presents the form of a circular membrane, perforated in the centre, and adhering by its circumference to the opening of the vagina. At other times, it fills up the entire orifice of the vagina, except a small opening above, corresponding to the meatus urinarius. There is also one other unusual form of it, in which filaments of mucous membrane are found uniting together the carunculæ myrtiformes. *Guy's Med. Juris.*, 67.

Owing to the fact that its free edge becomes relaxed and folded, about the period of puberty, there is reason to believe that, when the rupture takes place, it is chiefly in its folds, or depressions; and that, in this manner, the carunculæ myrtiformes are formed. These latter subsequently undergo changes, but rarely if ever entirely disappear. *Guy's Med. Juris.*, 67.

There can be little doubt, but that the hymen, in some one of its forms, originally exists in the great majority of females. Nor is there any real difficulty in ascertaining its existence, or its recent destruction by violence. Its recent destruction would be evidence of the recent employment of force, and thus furnish one of the essentials in the proof of rape.

As the carunculæ myrtiformes are the remnants of the destroyed hymen, their presence would prove the destruction of the hymen at some earlier period. The absence of the hymen must not be assumed as evidence that the female is unchaste. It may have been originally wanting. If not, a number of causes, other than connexion, may have destroyed it. It may have been destroyed, if the aperture be small, by the first menstrual flux, or by the accumulation of other discharges. It may also have been destroyed as the result of accident, or by the intentional introduction of foreign bodies, or by the occurrence of disease.

On the other hand, the existence of the hymen must not be hastily assumed as evidence of chastity. There are several instances on record, where sexual intercourse has taken place, and where conception has actually occurred, while the hymen remained entire. What is still more extraordinary, instances are cited, where children have been born without destroying it. *Guy's Med. Juris.*, 67–8; 1 *Beck's Med. Juris.*, 113.

It seems pretty evident, therefore, that no very great degree of importance should be attached to the presence or absence of the hymen.

2. *Narrowness of the vagina.* In the virgin state, the only function performed by the vagina, is the transmission of the menstrual flux from the uterus. For this, a very inconsiderable passage is sufficient. Its natural tendency is to narrowness, both from its own contractility and the pressure of surrounding parts. The turgescence caused by the greater determination of blood to the organs at the period of puberty, would also tend to place the parts in closer contact with each other. Various innocent causes may, however, relax and enlarge it; such as disorders to which the parts may be liable, and also a resort to certain practices. In the virgin state, there are usually to be found rugæ on the inner surface of the vagina. These are removed by frequent connexions, and destroyed by one or two deliveries. All these are liable to some variation, from the age, state of

health, and temperament of the individual. *Smith's Forensic Medicine*, 410–11 ; 1 *Beck*, 115.

3. Another indication is drawn from the appearance of the carunculæ myrtiformes. When red, tumid, and connected together by fleshy cords, they are said to indicate chastity ; while in the married state, they are pale, flaccid, and the cords torn asunder. 1 *Beck's Med. Juris.*, 116.

There are also other indications to be derived from an examination of the organs. These are principally the red and tumified appearance of the labia and nymphæ, and rupture of the fourchette. There are also others, but of so equivocal a character, as not to deserve being mentioned.

These signs of virginity are the most perfect between the period of puberty and the twenty-fifth year. *Ryan's Med. Juris.*, 161.

There have been various degrees of importance attached to their presence and absence. Each and all of them are undoubtedly equivocal, but there is a reluctance in denying that taking them all together, there is not some considerable importance to be attached to them. It has been asked, whether all can be entirely wanting, without furnishing any inference that the person is unchaste? The degree of importance attached to them should probably depend very much upon the circumstances existing at the time.

In regard to the presence or absence of these signs of virginity and the proofs they furnish of penetration by force, the following inferences are obvious :

1. The younger the subject, the less strong will be the signs of virginity ; but the more marked will be the evidence of violence done to the parts.

2. The more recent the injury inflicted, the more clear and satisfactory will be its physical indications.

3. In the case of married women, or those accustomed to sexual intercourse ; or, with the exception of very young subjects, where the examination is not made within a very few days after the infliction of the injury, this source of evidence is of little or no value.

The object to be accomplished by an appeal to this source of proof, is,

1. To prove the commission of the crime in subjects so young as to be incapable of giving their consent, and also of being witnesses in a court of justice:

2. To corroborate the testimony of the injured party, after she has attained the age of consent, and sufficient understanding to entitle her to be a witness: or,

3. To contradict her evidence after the arrival of the period last mentioned.

After the arrival of the age of consent, the crime of rape is not made out by proof of penetration by force. Another material element is then wanting, viz., that it was against the will of the injured party. In proving or disproving this, it is obvious very little can be expected of the medical witness. What he can furnish, is derived, principally,

2. From marks, or indications of violence found upon the persons of the prosecutrix or prisoner. On the person of the former, these will be found in the rumpled or torn appearance of the dress, and in the shape of bruises, generally on the groins, thighs, knees, arms and chest. The person of the latter may also exhibit bruises and scratches. In reference to these, should be carefully noted,

1. Their position. They may be on parts or in positions that would not be exposed to the prisoner, and hence afford evidence that they were self-inflicted, for the purpose of sustaining her testimony. Her willingness or unwillingness to submit to examination, might furnish some indication.

2. Their appearance, particularly their color, as indicating the period of time that had elapsed since the injuries were inflicted, with the view of comparing this time with the statements of the accuser. The variation of ecchymosed or bruised spots, in color, as time elapses after their infliction, will be noticed when on the subject of wounds.

It must not, however, be supposed that the presence of bruises or other injuries upon the person of the prosecutrix, is conclusive proof that consent was not given. They may have been,

1. Self-inflicted, with the view to sustain her testimony and to make out the case on the part of the prosecution; or,

2. Notwithstanding the violence, the conduct of the female may have been such as to imply consent on her part; or,

3. She may have consented after the infliction of the violence. The two latter are, perhaps, hardly consistent with a resort to any very great degree of personal violence.

3. The third source of proof is derived from any marks or spots of blood, or stains that may be caused by the spermatic fluid, on the clothes of the prosecutrix or prisoner. In case of recent injury spots of pure blood, presenting an uniform red color throughout, might be found on the clothes. After sufficient time had elapsed for the first hæmorrhage to cease, there will be a muco-sanguinolent discharge, staining the linen but less deeply, and uniformly, leaving a spot lighter in the centre but of a deeper color around the circumference. The co-existence of these with marks of violence would be a corroboration of the charge. *Guy's Med. Juris.*, 73.

Care must be taken not to confound this with the menstrual discharge. The blood resulting from injuries of this character would be arterial, and the menstrual blood is distinguishable from this—

1. By its non-coagulable qualities. As it contains little or no fibrine it is not coagulable.

2. By its color. It is darker than arterial blood, and does not, like venous blood, change color by exposure to the air. *Guy's Med. Juris.*, 73–4.

In relation to stains caused by the spermatic fluid, if a fluid is found having a seminal appearance it should be examined under the microscope, and if it be found to contain animalculæ, little doubt can remain of its being semen. These animalculæ are found in the semen of all male animals which have reached the age of puberty. While in motion, they present a spherical figure with filamentous tails. At rest, or dead, the fluid about them being dried up, they appear more oval with a tapering tail. *Guy's Med. Juris.*, 74.

These animalculæ may be discovered in semen that has become dry, provided it be carefully moistened. They have even been discovered in semen that had become putrid. Care must be taken not to rub or injure the pieces, as that would destroy their organization. After steeping the stained pieces thoroughly in distilled water, they may generally be detected by the microscope.

These seminal spots are of a color yellowish or grayish, and, when pressed between the finger and thumb, appear slightly stiff as if starched. They are inodorous, but when moistened give out the seminal odor. Exposed to heat, the spots become of a yellow fawn color, and small whitish spots make their appearance. This effect is said to be peculiar to the spermatic fluid. *Guy's Med. Juris.*, 75.

A seminal spot placed for some hours in cold distilled water is moistened evenly throughout, and gives out a spermatic odor. The liquid in which it is moistened becomes milky white and flaky, and in its characters or properties is,

1. Alkaline :

2. Mucilaginous. It does not coagulate, although it deposites some glutinous flakes :

3. Evaporated the residuum becomes semi-transparent, and when agitated in cold distilled water, divides into two parts, the one greyish yellow, glutinous, and insoluble in water, the other soluble in water :

4. The watery solution is yellowish, transparent, giving a white flocculent precipitate with chlorine, alcohol, acetate and sub-acetate of lead, and corrosive sublimate. Nitric acid gives it a yellowish tinge, but causes no precipitate. In all these, those which are the most peculiar to semen are the change of color on exposure to the fire, and the peculiar odor emitted. *Guy's Med. Juris.*, 75 – 6.

4. The fourth source of proof is that derived from the existence of gonorrhea or syphilis in one or both the parties. Should venereal infection coincide, in its appearance, with the time at which the crime is alleged to have been perpetrated, it would afford proof of violation. To do this it should appear from the third to the eighth day after the crime is alleged to have been

committed. Should it manifest itself immediately after it would have no other influence upon the decision of the case except the proof it would furnish that the female was unchaste. Should the examination be made some days after the injury complained of, and the disease should be found present in the female, it would prove her unchaste, provided it were absent in the accused, but if present in both would be a strong corroboration of the charge.

It should be borne in mind, however, that there are discharges from the vagina of young females, especially of children, of a nature entirely different from that resulting from venereal infection. Several instances are on record where mistakes in this respect have come very near resulting in serious consequences. See the case of Jane Hampson, as detailed in *Ryan's Med. Juris.*, 165, and also in 1 *Beck's Med. Juris.*, 119.

Sir A. Cooper places much stress upon this, and says that children from one year old and even under, up to puberty, are frequently the subjects of a purulent discharge from the pudendum, chiefly originating beneath the preputium clitoridis. The nymphæ, orifice of the vagina, and the meatus urinarius, are in an inflamed state and pour out a discharge. He supposes he has met with thirty cases of it in the course of his life. When this occurs there is a heat of the parts, slight inflammation, and this sometimes increases and goes on to ulceration. *Ryan's Med. Juris.*, 168.

Dr. Dewees also confirms this statement, and says that we occasionally find that very young children have a discharge from within the labia, of a thin, acrid kind, or of purulent appearance. Also that children of a more advanced age have discharges of a purulent character, that seem to arise from a morbid action of the mucous membrane of the vagina or labia. This frequently shows itself about the fifth year, and may continue, if neglected, to almost any period. *Ryan's Med. Juris.*, 168.

If, therefore, on examination, a discharge should be found, the medical witness should make a thorough examination into the nature and causes of it, before he can pronounce it the result of venereal infection.

This disease has been repeatedly observed by American physicians, and exists independent of external violence or of any syphilitic affection. According to Dr. Francis, no case has been noticed among us, where the individual had advanced beyond her seventh year, but this may have been accidental, and should not be relied upon as proving that it does not occur beyond that age. There is, however, no doubt of the fact that its occurence in the very great majority of cases is early in life, and this is a circumstance by no means to be lost sight of by the medical jurist. *Guy's Med. Juris.*, 72.

5. The fifth source of evidence relates to the age, strength, constitution, habits, situation, circumstances, mental powers and propensities of both the prosecutrix and the prisoner. This embraces a very wide range of proofs, and generally constitutes much of the evidence usually introduced on trials of indictments for rape. It is obvious from the statement of it, that the mere medical witness cannot, in virtue of what he derives from his profession, throw much light upon this source of evidence.

Medical men, it is true, ought, and most probably do, understand much better than others, the precise extent of organic capacity, and the amount of energy and power which are capable, in any given case, of being put forth either by way of subduing or resisting. They cannot only judge more accurately of the constitutional capacity, but they can also, better than others, appre ciate the modifying effect of age, and the influence that may be supposed to be exerted by habits, situations and circumstances. More especially where one of the parties is laboring under the effects of disease, must the medical examiner be relied upon to state what influence or effect that would be likely to exert upon the promptings of desire, and the exertion of physical power.

Where the strength of the parties is greatly disproportioned, as where a sound healthy adult male is charged with the commission of the crime upon a female under the age of puberty, no doubt can be entertained of the possibility of its commission by force. Prior to the period of menstruation, the female not only labors under a great deficiency of bodily strength, but her mind has fewer resources, and far less power and energy of will.

She is also probably ignorant of the consequences of the act, and hence her compliance may be more easily induced by fear. So also if she be infirm in body, or laboring under the effects of disease, while the accused exhibits much strength and vigor, her complaint will be much more readily believed. If her imbecility of mind be such as not only to deprive her of the ordinary resources to which other minds of her age can resort, but also to destroy its moral tone, and render her incompetent to judge of the morality of her actions, she cannot be supposed competent to interpose any effectual resistance.

So on the other hand, if the accuser is a firm, vigorous, strongly constituted female, and the accused is cachectic, or of a weak, sickly constitution, she will hardly, unless under peculiar circumstances, be considered entitled to full belief. Accusations against persons over sixty years of age should in general be rejected, unless they can be proved to possess an extra amount of strength and virility. 1 *Beck's Med. Juris.*, 122.

Where the accused and accuser are both in the full possession of health and strength, and of the ordinary amount of physical and mental power, the perpetration of this crime must be of difficult, if not of impossible, occurrence.

The opinion of medical jurists generally, is against the strongest probability, if not possibility, of its full and perfect accomplishment, where, under such circumstances, the woman retains her mental powers unimpaired, and also her bodily, except so far as they may be exhausted by her efforts at resistance. Although the attempt may be made, yet its successful consummation, under these circumstances, must be certainly, to say the least of it, a very rare occurrence. It may, however, be true, that the female may possess less coolness and deliberation in husbanding her strength, and by an early expenditure of more than may be necessary, in efforts of resistance, sooner produce a state of exhaustion.

The following are the usual exceptions, where the crime may be perpetrated notwithstanding the parties may approach nearly to a mental and physical equality:

1. Where narcotics or intoxicating liquids have been administered to her:

2. Where she falls into a state of syncope, from terror and exhaustion:

3. Where many are engaged against her, and in such case, there are usually many marks of injury about her person:

4. Where she yields under the influence of some severe threat, such as that of death or duress. *Taylor's Med. Juris.*, 462. The crime may be perpetrated under any of these circumstances, none of which furnish any excuse or palliation.

6. The consideration of some medico-legal questions, bearing directly upon the facts in controversy. Under this head, come up for consideration two questions which have occasionally arisen for discussion in connection with the trial of indictments for rape:

1. Can a female be violated during sleep, without her knowledge? This question has been answered in the affirmative by the medical faculty of Leipsic, and in the negative by the juridical faculty of Jena. It must depend much upon the circumstances of the case. If the sleep has been caused by narcotics, or by intoxication, or in case of syncope, or excessive fatigue, it is certainly a very possible occurrence, and would sustain the charge of rape. The possibility of it is denied in a case of natural sleep, and where the female is a virgin, *Guy's Med. Juris.*, 77; 1 *Beck's Med. Juris.*, 148–9.

It has been supposed possible, even in natural sleep, with females accustomed to sexual intercourse. Indeed, this would seem to be well established, from the fact that there exist cases where pregnancy has resulted from such intercourse had during the sleep of the female. The case, however, must be of very rare occurrence, in which the sleep, when purely natural, can be so profound, as, with such females, to admit the full act of sexual intercourse without their knowledge.

2. Does pregnancy ever follow rape? If it never does, then its subsequent occurrence, with some rare exceptions, would be proof of consent, and would be, therefore, a sufficient defence to an indictment for rape. This might furnish adequate cause to delay the trial of the prisoner until sufficient time had elapsed to determine whether pregnancy did or did not exist.

Those who assert that it never does follow, incline to the belief that the venereal orgasm is always necessary to conception; and that the fear, terror, horror and aversion that accompany rape, must effectually prevent its occurrence. It has been suggested, that notwithstanding the sedative effect of these passions, the orgasm may nevertheless take place, as its occurrence or non-occurrence is not dependent upon volition. 4 *Good's Study of Medicine*, 100.

The more prevailing opinion seems now to be, that the functions of the uterine system are independent of the will; and that conception may, therefore, occur, whatever be the volitions of the sexes, or the operation, at the time, of the emotions and passions. The fact that it has taken place when the female was, at the time, under the influence of narcotics, of intoxication, of asphyxia, and in a state of sleep, certainly shows that neither the operations of mind, nor the venereal orgasm, are in any degree necessary to its occurrence. *Guy's Med. Juris.*, 77–8; 1 *Beck's Med. Juris.*, 149–50.

It now only remains to direct the attention to the points of inquiry that should arise, in cases of alleged rape.

The complaining party should be immediately inspected, and the time of the inspection compared with that at which the offence is alleged to have been committed.

The age, size, strength, and general habit should be observed, and any injuries on her person should be compared with the cause assigned for their infliction. The state of the clothes should also be remarked.

The organs of generation should be particularly examined. It should be remarked whether they are natural in appearance, or swollen, inflamed, abraded or ulcerated; whether there is any discharge, and, if so, from what part it flows; whether the hymen is present and entire, or ruptured; whether the carunculæ myrtiformes are visible; whether the fourchette is injured, and the vagina enlarged or narrow. Ascertain, if possible, whether the alleged violation took place during the menstrual period, or while laboring under any debilitating discharge. It would be well, if possible, to ascertain the date and origin of all the marks or indications of violence found, with the view of determining whether some other cause than that alleged, might not have contributed to their production. Foreign bodies have been sometimes purposely applied to, or introduced into the parts.

Every discharge should be carefully observed, collected and examined, to determine whether it is the result of gonorrhœa, leucorrhœa, &c. Any spots, apparently of blood or semen, should be tested in the way already alluded to.

In case death has taken place, the body should be examined, to see whether any bruises, fractures, or dislocations are present. It should be ascertained whether any foreign bodies have been thrust into the mouth. If practicable, the spot on which the offence is alleged to have been committed, should be examined, to compare it with the appearances discovered on the body of the female.

The person of the accused should also be examined, with the view of ascertaining whether any bruises, scratches, or other marks of resistance are discoverable; whether there are any spots of blood or semen on his linen; and also what is his size, strength, health, and bodily development. The organs of generation should be examined, to discover whether he is impotent, or capable of producing the amount of injury discoverable on the female; and also, whether he have the venereal disease, and if so, what is its stage, or how long he has probably had it. *Guy's Med. Juris.*, 78–9.

IV. PREGNANCY.

There are few subjects within the range of Medical Jurisprudence, that gather around them a greater degree of interest than the signs and indications of Pregnancy. Independent of the bearing they have, and the influence they exert upon domestic and social life, the occasions when the investigation of them is rendered legally necessary, are neither few nor unimportant.

Some occasions exist in England for this investigation which do not in this country. One is that proceeding under the common law, where a widow is suspected to feign herself with child, in order to produce a supposititious heir to the estate, and thus to defraud the lawful heir. The presumptive heir may in such case have a writ *de ventre inspiciendo*, by which the sheriff is commanded to have search made, and the fact determined whether pregnancy exists or not, by twelve matrons in the presence of twelve knights. If the result determine the fact of pregnancy, then she is to be kept under proper guards until she is delivered. If the pregnancy is negatived, the presumptive heir is admitted to the inheritance.

The most remarkable case illustrating this, is that of Sir Francis Willoughby, reported in *Crokes Elizabeth*, 566. The practice has been somewhat modified in a recent case, so as to appoint two medical men with two matrons to visit the female every fortnight, instead of the examination to be made by the jury of matrons in the presence of the knights as was required by the earlier practice.

Another occasion when it becomes necessary to enquire into, and ascertain the fact of pregnancy, is when a woman is convicted of a capital crime and pleads pregnancy. In such a case, if the fact of pregnancy appeared on the examination, the execution was respited until after the delivery.

According to the common law of England, in case this plea be made in stay of execution, the judge must direct a jury of twelve matrons, or discreet women, to ascertain the fact; and if they bring in their verdict *quick with child*, (for barely *with child* unless it be alive in the womb, is not sufficient,) execution shall be stayed generally till the next session, and so from session to session, till either she is delivered or proves by the course of nature not to have been with child at all. 4 *Blackstone's Com.*, 394–5.

In Scotland, all that is necessary to be proved to have execution delayed, is the fact of pregnancy, no difference being made whether she be quick with child or not. This is also the provision of the French penal code upon this subject. 1 *Beck's Med. Juris.*, 155–6. These provisions have the merit not only of leaning strongly to the side of mercy, but also of being founded upon just and sound physiological principles.

It is not a little singular that with all the light and knowledge there is upon that, and other kindred subjects, the late Revised Statutes of New-York, should not have contained more enlightened provisions on this subject. They provide that in case of pregnancy in a female sentenced to capital punishment, the sheriff shall summon a jury of six physicians, and give notice to the district attorney who has power to subpœna witnesses. If on the inquisition the female is proved to be *quick with child*, the execution shall be suspended, and the inquisition transmitted to the governor. Whenever he is satisfied that she is no longer *quick with child*, he is to issue his warrant for execution, or to commute it by imprisonment for life in the State prison. 2 *R. S.* 658.

Quickening, as we shall see hereafter, has no certainty as to the time of its occurrence, but it usually takes place about four months after conception. An infant is the inheritor of real estate from the moment of its conception. In this case, therefore, the law presents the singular anomaly of investing an infant, at its conception, with the inheritance, and the rights appertaining to the ownership of real estate, and yet four months afterwards of executing it unheard for the crime of its mother.

There is also another case in which the law of England has interfered on the fact of pregnancy being brought to the knowledge of the court, and that is where a female in this situation is imprisoned. In such case she is admitted to bail to prevent the peril of death to her and her infant. *Guy's Med. Juris.*, 87–8.

It is not on these important occasions alone that it may become necessary to ascertain the fact of pregnancy. There are many others where its investigation becomes necessary. It may be attempted to be *feigned* by the unmarried, with a view to extort money; or to induce a paramour or seducer to marry; or in an action brought for breach of promise of marriage, she may allege pregnancy as a means of influencing the jury in the assessment of damages. *Guy's Med. Juris.*, 85.

The married may also *feign* it to gratify the wishes of a husband, to produce a supposititious heir to the estate, to delay the execution of capital punishment, or to escape from imprisonment.

There are also motives that may induce its *concealment.* Both the married and unmarried, particularly the latter, may attempt it to avoid disgrace, or with a view of procuring abortion, or of committing infanticide.

Thus the occasions are numerous which may require the medical jurist to determine the existence or non-existence of this fact. And it must also be borne in mind that he may, and most commonly is, called upon to do this under the most unfavorable circumstances. It not unfrequently happens in such cases that he cannot rely on a single statement made by the individual who may be the subject of examination; but, on the contrary, he must be prepared for every species of falsehood and misrepresentation. *Montgomery's Signs of Pregnancy*, 30.

Under these circumstances, and the pressure of these difficulties, the medical jurist will naturally resort to all the sources of proof accessible in questions of this character. These sources are various, and widely different, some depending upon the report made or the information furnished him, while others consist in the changes induced and cognizable by the senses.

The signs and indications of pregnancy are derived principally from two sources. These are,

1. The changes that occur in the constitution of the female, consequent upon conception:
2. The sensible changes and indications that are caused by the development of the uterine system.

The first change from the normal state which follows conception, is to be found in the uterine system. There is an immediate determination of blood to this system. A new principle is introduced, whose modifying influence is to extend through the whole economy. There is a great increase of vascularity in the uterus and its appendages. Its vessels are distended with blood; its tissues infiltrated with serum; its bulk increased; texture softened; fibres separated; and such a remarkable increase of vital action takes place in it, that it is thrown into a state which has been termed " analogous to inflammation. *Hunter on Gravid Uterus*, 82; *Montgomery's Signs of Pregnancy*, 2.

Nor is the change limited to the circulating system. The nerves of the uterus are observed to increase both in number and in size. They consequently impart to it a higher degree of sensibility. Their close connexion with the great abdominal plexuses, enables them quickly to diffuse their influence through the general system, which is found soon to sympathize with this local excitement.

The changes, therefore, effected in the general system, in consequence of the uterine development, may be expected to be somewhat marked and decided. It should, however, be understood, that, owing to differences of temperament, and organic peculiarities, the varieties in the female constitution are very great, and hence, that although the changes that can be collected from all the varieties are strongly marked and decided; yet when their application comes to be made to any individual case, very many of them may be wanting.

The round ligaments of the uterus are stretched by its enlargment; from which, and from the increased sensibility of their nerves, an uneasiness is frequently felt, which extends along the nerves of the thigh, producing numbness, cramp, and considerable pain along the limb. These symptoms are often among the earliest indications of uterine irritation. *Montgomery's Signs of Pregnancy*, 4.

After pregnancy is somewhat advanced, it is not unusual for the uterus, by its pressure upon the trunks of the veins, to cause anasarcous swellings of the feet and legs, and sometimes varicose veins and hemorrhoidal tumors. As there is also sometimes an œdema of the upper extremities and face, there would seem to be, occasionally, a more general cause than the pressure just mentioned. *Montgomery's Signs of Pregnancy*, 5.

The increased vascular action produced in the uterus after conception, frequently extends through the entire system, inducing a somewhat plethoric state of the blood vessels. So, also, the increase of nervous irritability displays itself under a variety of forms, rendering the female more excitable, and more subjected to the influence of the emotions and passions, especially those of fear, joy, sorrow, and anger. Many melancholy instances are on record, of the unfortunate results of the influence of these passions upon nervous females, during the period of utero-gestation. *Montgomery's Signs of Pregnancy*, 12–13–14, *et seq.*

The effect of this nervous irritation not unfrequently works a change in the moral temperament, evidenced by depression and despondency, rendering her peevish, irritable, capricious and wayward. This usually disappears, giving place to natural cheerfulness, as pregnancy advances, especially if it be connected with good bodily health. *Montgomery's Signs of Pregnancy*, 18–19.

In other cases, the depression deepens with time, and is accompanied by an apathetic indifference to circumstances and events. Occasionally the cerebral disturbance proceeds so far as to amount to absolute derangement of some one or more of the faculties of the mind. *Ib.*, 20.

In some cases, a great tendency to drowsiness exists, which is so great in degree, that it requires the severest effort to overcome it. *Montgomery's Signs of Pregnancy*, 150–51.

An alteration is sometimes to be noticed in the features and expression of the countenance, which is termed by the French writers a decomposition of the features. They are observed, especially the nose, to become sharper, and more elongated; the mouth larger; the eyes sunk, and surrounded with a brownish or livid areola, having a languid expression. The body, except the breasts and abdomen, becomes more emaciated. *Montgomery's Signs of Pregnancy*, 150.

Strange appetites and antipathies are not an unfrequent attendant of pregnancy. Longings for revolting articles, and aversions founded on no reason, characterize this condition of the system. *Ibid*, 151–2.

In some females, pains in the teeth and face are invariable accompaniments of pregnancy. There are also some instances in which dark spots or blotches appear upon the face and other parts of the skin, and they have sometimes been permanent. *Ibid*, 152–3.

Some women, during this state, are troubled with frightful dreams, proceeding probably either from disorder of the alimentary canal disturbing the irritated nervous system, or from an irregular or undue circulation of blood in the brain. *Ibid*, 153.

Another accompaniment that has been mentioned is a peculiar headache, consisting of an acute pulsating pain in the occipital region, accompanied with giddiness on motion, coming on suddenly and succeeded by inclination to sleep. As headache may be produced by a variety of causes it cannot be much relied on. *Ibid*, 153–4.

It has been asserted that the blood of pregnant women always presents the buffy coat and other characters of inflammation, but experience has shown that no reliance can be placed on this as an evidence of pregnancy. In females of full habit, sanguine temperament, and where the pulse is accelerated, the blood may present some of the modified characters of inflammation up to the third or fourth month of utero-gestation. *Montgomery's Signs of Pregnancy*, 155–6.

Indications have also been sought to be drawn from the appearance exhibited by the urine of pregnant women. By allowing the urine to stand some thirty or forty hours a deposit is sometimes found to take place of white, flaky, pulverulent, grumous matter, being the *caseum*, or peculiar principle of milk, formed in the breasts during gestation. In many instances the deep color and turbid condition of the urine will prevent the deposit from being observed, but where it is clear, it appears as if a little milk, having been thrown into the urine, had partly reached the bottom, while a part remained suspended and floating through the lower part of the fluid, in the form of a whitish semi-transparent filmy cloud. *Montgomery's Signs of Pregnancy*, 157–8.

Although Dr. Montgomery seems from his experience, to attach considerable importance to this indication, yet it would seem from some specimens of urine submitted to examination, that a white flocculent precipitate, similar to that described, subsided spontaneously after twenty-four hours, not only from the urine of pregnant women, but also in equally great quantity from that of a virgin of the age of fourteen, and that of a woman nursing for two months. Dr. Kennedy supposes this indication of no value. *Kennedy on Pregnancy and Auscultation*, 56–7.

There is also an appearance somewhat different from this, upon which reliance has been placed. The urine, after standing one or two days, becomes turbid, and in case of pregnancy, fatty globules rise to the surface, forming a pellicle resembling that left on the surface of mutton broth on cooling. This remains swimming on the surface for three or four days, and is termed *Kiestein.* It breaks up and disappears as the urine becomes putrid. It continues faintly acid until the breaking up, when it developes ammonia. This should not be confounded with the earthy phosphate which forms on the surface of the urine after long repose, as that is developed by putrefaction, while this is destroyed by it. *Guy's Med. Juris.*, 92.

It should, however, be borne in mind, that many accidental causes are capable of altering the condition of the urine; so that great caution should be exercised in reference to any deduction to be drawn from this source of proof.

An indication is also sought to be drawn from the state of the pulse. This has been so thoroughly refined upon, that some have professed themselves able to discover from it, not only the fact of pregnancy, but also its period of advancement, and even the sex of the child. *Montgomery's Signs of Pregnancy*, 158.

All that can with safety be said on this subject, probably, is, that during the earlier periods of gestation, the pulse is generally stronger and more rapid than is natural to the individual at other times. But among the multitude of causes that may excite to increased action, this certainly should have little or no reliance placed upon it. Dr. Osiander has remarked, that during gestation, the uterine artery is enlarged, as is also the vaginal, and that the action of the latter is increased, so that its pulsations may be ascertained to be both stronger and harder, and its calibre greater than usual. See *Montgomery's Signs of Pregnancy*, 158–9.

Many of the signs and indications already mentioned, are only occasional, but their occurrence during the first pregnancy, renders it more probable that they will be present during the subsequent ones of the same individual. There are other signs and indications that are found more generally present. Among the most prominent of these are—

Suppression of the menses, or catamenia. This is a discharge arising from a secretion from the internal surface of the uterus, which occurs at periodical, usually monthly intervals, and continuing, with few exceptions, from puberty to the approach of old age. *Kennedy on Pregnancy and Auscultation.*

The exceptions are when the functions of the organ are altered or suspended, as during pregnancy, nursing, or in a state of disease.

As a general rule this discharge is suspended during pregnancy. But conception may have occurred previous to its commencement. Of this there are cases on record. *Montgomery's Signs of Pregnancy*, 41-2. There are also cases in which women have conceived after menstruation had apparently ceased. There are also cases of somewhat rare occurrence where women have conceived when the menses have been long suppressed in consequence of disease. *Ibid*, 43.

Some women are very irregular in the returns of these periods, having them delayed beyond the usual intervals. At the period denominated the change of life, they are sometimes suppressed, for two or three months, and then return profusely. *Ibid*, 43.

Suppression may arise from many causes independent of conception. It may be caused by different forms of disease, by exposure to cold and hardship, by severe mental emotions, more particularly by that of fear. *Ibid*, 43. Of this latter there are numerous instances occurring, especially in prisons, where females are confined under very unfavorable circumstances.

In young and recently married females it is not unusual that suppression occurs for two or three periods, the breasts at the same time increasing in size and becoming sensitive. After the lapse of two or three months, what appears an ordinary menstruation occurs, and in this manner these indications of conception pass away. They are frequently supposed to be miscarriages, and it is not at all improbable that conception really took place, but the ovum soon after perishing, all the signs and indications passed away. *Montgomery's Signs of Pregnancy*, 44.

The high authority of Denman, sustains the rule that "suppression of the menses is one of the never failing consequences of conception." To this, however, there are certainly exceptions. There are certainly instances in which menstruation occurs once after conception. There are also individuals who menstruate with regularity for more than one period after conception. Sometimes for two or three months these menstrual discharges continue.

There are even cases occurring where the menstrual discharge continues through nearly the whole period of pregnancy. But the most extraordinary of all cases are those in which menstruation has either appeared for the first time after conception, or in which it continued only during pregnancy. *Montgomery's Signs of Pregnancy*, 49 – 50.

There are not wanting instances of these most singular and anomalous cases.

There are some cases in which the secretion takes places, but the discharge is prevented by some obstacle. This obstacle is usually an imperforate hymen. In such cases an accumulation takes place within the uterus and vagina, distending both and giving rise to several of the sympathies which usually accompany pregancy. Several instances of this are stated by Montgomery. *Ibid*, 51 – 52.

It may be well in this connexion to advert to one means of deception that may be practiced ; and that is that a female really pregnant may pretend to have her periodical discharges regularly and imitate the catamenia by blood. This may usually be detected from the fact that the menstrual discharge contains little or no fibrine, and does not coagulate as the blood does. *Kennedy on Pregnancy and Auscultation*, 15.

Another constitutional indication which is present in the majority of cases is *nausea and vomiting*. In some this commences almost immediately after conception. It the most frequently occurs between two and three weeks after, and prevails the most during the early periods of pregnancy. In some, however, it does not occur until two or three months after conception, and in others not at all. *Montgomery's Signs of Pregnancy*, 53.

Irritability of stomach may occur from a variety of causes other than conception and pregnancy. Suppressed menstruation may give rise to it. It may be caused by many varieties of disease. One of the principal criteria by which it is recognized as a sign or indication of pregnancy is, that it is unattended by any form of disease. Its occurrence in the midst of good health, when the appetite is good, and in the early part of the day is looked upon as a sign or indication of some value. *Montgomery's Signs of Pregnancy*, 53–4.

The sympathetic irritation causing nausea and vomiting sometimes extends to the salivary apparatus, and produces there such an effect as to cause a complete and copious salivation. There have been several well authenticated instances of this, although it cannot be said to be common. It is easily distinguished from mercurial ptyalism by the absence of the peculiar fœtor of the breath, and also of sponginess and soreness of the gums.

Another source of evidence from which many of the proofs of pregnancy are derived, is to be found in the *mammary sympathies*, which consist principally of the *enlargement* and *sensibility* of *the breasts;* the formation of the *areola*, and the *secretion of milk.* These, although in themselves sensible signs, derive, nevertheless, their existence through the constitution, and should therefore, come under that class.

After conception has taken place, and the menstrual discharge has been suppressed for one or two periods, a change commences in the breasts; a sensation of throbbing is experienced, accompanied with a sense of soreness and tingling felt about the centre and in the nipples. This sometimes does not occur until the pregnancy is considerably advanced, but usually commences when about two months of it have become completed. *Montgomery's Signs of Pregnancy*, 56–7.

At the same time the breasts themselves grow larger and firmer. This not unfrequently causes pain from the tension of the integuments.

All these changes in the breast may result from causes other than conception. They may arise

1. From marriage and the habits thence arising.
2. From becoming fat.
3. By accidental suppression of the menses, or retention by an imperforate hymen, or other causes capable of distending the uterus. *Ibid*, 56–7.

The enlargement of pregnancy may, in general, be distinguished from that which arises from becoming fat, by the fact that the breast has greater firmness, and feels knotty and uneven when pressed, and also that a corresponding fullness is not found in other parts of the body. In some irritable habits, swelling and pain in the breasts, accompany each return of the catamenia.

In such cases, the tension and uneasiness disappears in two or three days, while that caused by pregnancy continues to increase, unless the ovum becomes blighted, when the breasts become flaccid, and lose their previous appearances. In females of weak and delicate constitution, less changes will occur in the breast, and those at a more advanced period of pregnancy. Neither may they be expected to be found in those who menstruate during the early period of pregnancy. *Montgomery's Signs of Pregnancy*, 57–8; *Guy's Med. Juris.*, 89.

It should be borne in mind, that in some individuals, the breasts are naturally much fuller than in others, and that a greater fullness may also take place at the turn of life, when the menses are suppressed, and the person grows fatter, and the breasts frequently become full, and sometimes painful. From the fact first mentioned, one obvious inference may be derived, and that is, that it is not the absolute size of the breasts that is to be taken into consideration, but the relative size; that is, their comparative greater size than had formerly been observable in the same individual.

Another indication very much relied on as affording a proof of pregnancy, is,

The Areola. This is a circular disc surrounding the nipple, and presents the following peculiarities:

1. In its *dimensions.* Its diameter varies with different periods of pregnancy. At its first appearance, it may be about an inch in diameter. It continues to enlarge, until its greatest dimensions may exceed two inches.

2. In its *color.* At its first appearance, its color is, in general, little more than a deeper shade of rose or flesh color, slightly tinged with a yellowish or light brownish hue. As pregnancy

advances, the color continues to deepen, assuming a browner and darker appearance. The intensity of the color depends much upon the complexion of the individual, being usually much darker in persons with black hair, dark eyes, and sallow skin, than in those of fair hair, light colored eyes, and delicate complexion. In negro women, it becomes jet black, with somewhat of a purple shade through it. The color of the areola depends on the deposition of an actual pigment between the cuticle and subjacent skin. In some, the coloring matter is removed after delivery; in others, it remains permanent. *Montgomery's Signs of Pregnancy*, 60–65.

It is peculiar to some young females to have the areola assume a shade of color resembling that often observed around or under the eyes; and in women of a swarthy hue, it is sometimes found of a dark shade in the virgin state; while in such, in a state of pregnancy, it becomes of an intensely dark, almost black, color. *Montgomery's Signs of Pregnancy*, 65–6.

Great importance has, by some, been attached to the color, but Dr. Montgomery remarks, that pregnancy may exist, and the areola remain deficient in that generally supposed to be its most important distinctive mark, viz., the color. This deficiency is not often met with, except in persons of fair skin, blue eyes, and light hair. But when the color is deficient, the other characteristic changes may be well developed. *Ib.*, 63.

3. In its *raised appearance, turgescence, and glandular follicles.* The surface of the areola, especially that part of it lying more immediately around the base of the nipple, exhibits a raised appearance; the integument covering it appearing turgescent, soft, and in a moist state. This may be caused by infiltration of subjacent cellular tissue. There is undoubtedly a greater degree of vital action going on there, than in the parts around it. *Ib.*, 59–61.

One peculiarity in this raised integument is that it is studded over and rendered unequal by the prominence of glandular follicles, which vary in number, usually from twelve to twenty. They project from the sixteenth to the eighth of an inch, and are not unfrequently bedewed with a secretion sufficient to damp and color the woman's inner dress. These follicles are sometimes wanting. Hence their absence should not be considered as conclusive evidence that pregnancy did not exist, while their presence may be received as convincing proof of previous conception. There is by many, and probably with justice, more importance attached to the turgescence of the integument, and the presence of the follicles, than to the color; those being considered as the principal distinctive mark, between the part during pregnancy and at other times. *Montgomery's Signs of Pregnancy*, 59, *et seq.*

In the centre of the colored circle is observed the nipple, partaking also of the altered color of the part, and appearing turgid and prominent. Towards the latter period of pregnancy, especially in women of dark hair and eyes, numerous round spots or small mottled patches of a whitish color are to be seen scattered over the outer part of the areola, and for about an inch or more all round, presenting an appearance as if the color had been discharged by a shower of drops falling on the part. *Montgomery's Signs of Pregnancy*, 81 – 2.

The earliest period at which these characteristics of the areola appear is at the end of the second month. At this time is observable not only the alteration in color, but also the puffy turgescence of the nipple and its surrounding disc, together with a slight development of the little glandular follicles. From this period all these go on increasing in proportion to the progress of the pregnancy, until its full term is completed. At the end of the fourth month its changes in general become perfected or nearly so, when it exhibits the characters previously mentioned.

Should the fœtus become blighted in the progress of the pregnancy, the mammary sympathies cease, and the changes in the areola decline and fade away. The follicles shrink, and no longer bedew with moisture. So also the breasts become soft and flaccid, lose their sensibility, and cease to exhibit the enlarged condition of the veins. *Montgomery's Signs of Pregnancy*, 60 – 63.

In regard to the conclusiveness of the areola as an indication of pregnancy, there is some difference of opinion. Dr. Montgomery, following the authority of Smellie and William Hunter, regards it as the result of pregnancy only. Others claim that the enlargement of the mammæ, and the discoloration of the areola, are alterations brought about by several other conditions.

Various disorders of the uterine system, it is said, will produce an augmentation in the size of the breasts and a darkened areola. *Guy's Med. Juris.*, 91. It may, perhaps, be questionable whether those who doubt its sufficiency as evidence may not have confined their attention more to some one of its characteristics, such as its color, than to all its distinctive features. From all the evidence offered, it is difficult to come to the conclusion, but that the true areola, when all its distinctive characteristics are present, is a very clear and satisfactory indication of pregnancy.

Another usually ranked as an indication of pregnancy is—

Milk in the breasts. This is popularly esteemed an infallible proof of pregnancy. It is, however, far from being really such. The secretion of milk has taken place under circumstances independent of pregnancy and even of intercourse. It has taken place at almost all ages, having occurred prior to puberty, and after the cessation of the generative faculty. *Montgomery's Signs of Pregnancy*, 69. There are even well authenticated cases on record, and some of recent occurrence, where this secretion has taken place in the breasts of men, and where they have given suck to young infants. There have been cases where women have had milk in their breasts from one pregnancy to another, and even for whole years together, although they have not nursed. *Guy's Med. Juris*, 92.

The secretion may occur from morbid causes that are capable of distending the cavity of the uterus. The indication can really be of no great value, as milk is seldom secreted until after delivery, and should it happen to be, during the progress of utero-gestation, it is only at so late a period of it, that much more unexceptionable proof can be afforded from other sources than is properly derivable from this.

This closes the enumeration of the constitutional signs and indications of pregnancy. It will be obvious, on slight reflection, that the presence or absence of very many of these signs and indications, as well as the extent or degree in which they are manifested, will depend much upon the constitutional peculiarities, state of health, temperament, and mode of life of the individual.

The other class of signs and indications embraces those changes rendered immediately apparent by the *uterine enlargement*, and the appearances that are consequent thereon; including, also, the evidence derived from *auscultation*. These may be termed the *uterine or sensible signs*.

These signs address themselves to three of the senses, viz., *the senses of sight, touch and hearing*.

The eye informs us of the enlargement of the abdomen, and also of the state of the breasts, and character of the areola, already considered. The touch acquaints us with the fact of pregnancy, by external examination, through the abdominal parietes, by internal examination per vaginam, and by ballottement or repercussion. The hearing brings to us certain sounds resulting from the state of the circulation in the gravid uterus, and the action of the fœtal heart. *Montgomery's Signs of Pregnancy*, 112.

1. *Abdominal enlargement.* Subsequent to conception, the uterus, becoming developed at its fundus, descends lower into the cavity of the pelvis; and hence, during the first two months, the abdomen often appears unusually flat, and the umbilicus, at the same time, drawn in and depressed. These changes are in some cases so marked, that some authors place reliance upon them as proofs of pregnancy. *Guy's Principles of Forensic Medicine*, 93.

Before the end of the third month, the abdomen becomes perceptibly enlarged, and this goes on increasing during the period of pregnancy, accompanied with corresponding changes in the state of the umbilicus. *Montgomery's Signs of Pregnancy*, 92.

There are females who, from their height, or some peculiarity of form, exhibit very much less than others, this enlargement of the abdomen.

In case of the death of the fœtus in utero, the progressive enlargement of the abdomen ceases, and sometimes in such cases, it will appear to diminish.

Not only are there cases in which there is not a corresponding enlargement of the abdomen, but there are also others, on the other hand, where the enlargement is owing to other causes than pregnancy. It may result from morbid conditions not affecting the uterus, as disease of the liver, spleen, ovarian tumor, or ascites; but in any such case, the length of time the enlargement has existed, the diseased condition of the system, the character and situation of the tumor, the state of the umbilicus and breasts, and the want of correspondence in the symptoms and conditions of the case, if it were pregnancy, will furnish sufficient indications. *Ib.*, 93.

They will also generally be sufficient, either alone or in connexion with vaginal examination, if the uterus itself be distended.

In case of the distension of the abdomen with fat, it will be indicated by the soft and yielding condition of the part, under the hand, taken in connexion with the absence of any solid tumor, and also of the ordinary symptoms of pregnancy.

Ascites may be distinguished from pregnancy,

1. By the fluctuation that is present and the absence of any solid tumor,

2. By the form of the abdomen when standing or lying down, which in case of pregnancy retains about the same degree of prominence, but in dropsy subsides, flattens down, and spreads out.

3. In dropsy the constitutional disturbance will increase with the increase of size, in pregnancy it will diminish.

4. In the former, there is much thirst and scanty urine, not in the latter.

5. In the former, the swelling of the feet is usually prior to that of the abdomen, in the latter subsequent.

It is, however, possible that both may exist together, in which case the state of the breasts should be examined, particularly the areola, and recourse may also be had to the examination of the uterus per vaginam. *Montgomery's Signs of Pregnancy*, 95.

There may also be morbid growths within the uterus, such as moles, hydatids, and membranes produced in dysmenorrhœa, which will have the effect not only to distend the uterus, and thereby produce abdominal enlargement, but will also at the same time give rise to many other of the usual indications of pregnancy. *Guy's Principles of Forensic Med.*, 93.

These will be more fully considered under the head of substances expelled from the uterus. Another sensible sign connected with the enlargement of the abdomen is the

State of the Umbilicus. During the first two months this is rather retracted and more depressed than usual. In the third month it becomes restored to its natural state: in the fourth, is found less hollow than before conception; in the fifth or sixth, is nearly on a level with the surrounding integuments; in the sixth or seventh, completely so; and towards the close of gestation projects, in most persons, considerably above the surface. Any solid tumor enlarging the abdomen will also have the effect of elevating the umbilicus. *Montgomery's Signs of Pregnancy*, 97–8.

Another source of evidence of great value is that derived from

Quickening and the fœtal motions. The time of quickening is rendered of great importance by the law fixing upon that as the period when the fœtus in utero first becomes endowed with life. We have already seen what effect the law gave to it when the mother was under judgment of condemnation for some capital crime. We shall hereafter see what a wide difference it makes in reference to injuries inflicted on a fœtus in utero, whether they were inflicted prior or subsequent to the period of quickening.

Physiology, for the clearest reasons, denies the assumption of the law, that at the period of quickening, life is first infused into the fœtus. As physiology has here the better right and the clearer reason, we shall allow it to define quickening, which it does by stating that it is the first sensation experienced by the mother of the life of the fœtus in utero. *Montgomery's Signs of Pregnancy*, 75. This definition of quickening subjects this source of evidence to this difficulty, that it is rendered dependant on the statements of the mother. Allowing that these statements are intended to be truthful, she is very liable to be mistaken. Sometimes when the fœtal motions are perceptible to the hand of another, the mother has no sensations indicating the existence of such motions. There are also examples of women, as in the instance of Queen Mary, who have supposed and firmly believed that they have quickened when no such thing had occurred.

In some instances fœtal motions, from some cause difficult to explain, become suddenly suspended, without the occurrence of any injury to the child. A strong mental emotion on the part of the mother has had this effect. *Montgomery's Signs of Pregnancy*, 81.

Some have supposed they felt these movements when there was no state of pregnancy existing.

This naturally leads to an enquiry as to how a deception of this kind can occur, and what are the causes of it. They may arise,

1. From air in the intestines passing quickly from one part to another:
2. From the effect of nervous irritability in the female:
3. By spasmodic twitching of some of the abdominal muscles or a partial contraction of those of the uterus when distended with air or fluid:
4. From the pulsation of the great arteries, more especially when felt acting on a tumor, as in the case of an enlarged ovary.

There are two singular facts connected with these deceptions.

1. They are perceptible to the female and recognised by others.
2. At the termination of the imaginary period of gestation there has been an accession of pains strongly resembling those of labor. *Montgomery's Signs of Pregnancy*, 83–4.

It is asserted that some women possess the power of simulating the motions of the child by means of certain actions of the abdominal muscles. Instances of this kind must be very rare. One is recorded in the case of Joanna Southcott. *Ibid*, 84–5.

Quickening has been very generally supposed to take place when the uterus rises out of the pelvic cavity into that of the abdomen. *Kennedy on Pregnancy and Auscultation*, 22.

There is no fixed, uniform time for its occurrence. An idea is of common prevalence that it takes place exactly in the middle of gestation. This is not borne out by experience. It happens from the tenth to the twenty-fifth week, and the greater number of cases will be found occurring between the end of the twelfth and sixteenth weeks after conception. Dr. Hamilton says it takes place at the end of four calendar months after conception.

After quickening has occurred many of the signs and indications that mark the early period of pregnancy disappear, perhaps owing to the altered position of the uterus.

When pregnancy is complicated with ascites, the quickening will not occur until a later period, and will be perceived less frequently and less distinctly. There are also occasionally the entire absence of these movements through the whole period of gestation, notwithstanding the child may be born alive and healthy. These latter cases will be more likely to occur in extremely sluggish and lymphatic temperaments. *Montgomery's Signs of Pregnancy*, 87–8.

These movements may sometimes be excited by a sudden application of the hand, having been previously rendered cold by immersion in water, on to the front of the abdomen. This frequently has the effect to make it start.

Another method is to apply one hand against the side of the uterine tumor and, at the same time, to impress the opposite side quickly with the fingers of the other hand. At first, and during the fourth or fifth months, the movement communicates only a slight pat or throb, or merely a flutter, which sometimes is more strongly felt at particular times of the day. In the sixth and seventh months the movements are greatly increased in distinctness, and in the last two months they not unfrequently cause a distinct elevation of the abdominal parieties, so as to be visible through the ordinary dress of the female. *Montgomery's Signs of Pregnancy*, 89–90.

It is necessary to bear in mind that there are two species of movements; the one is passive, consisting in a mere change of place, and may occur whether the fœtus be living or dead. The other consists in muscular movements, and is therefore only consistent with life. The mother is not unfrequently deceived, mistaking the merely passive for active movements.

The next subject of enquiry may properly be,

The state of the os and cervix uteri. In the virgin or unimpregnated state, the os, and lower portion of the cervix, are found projecting from a quarter to half an inch into the cavity of the vagina.

The part thus projecting feels firm, is conical in its form, and at its termination in the vagina has a transverse opening, whose lips or margins are firm and well defined.

At conception and subsequently, all these characters change. The uterus and its appendages become not only much altered in texture but also increased in size and weight. The cervix becomes fuller, rounder, softer and more elastic. The lips or margins are tumid, softer and less distinct, the orifice feeling circular instead of transverse. These changes, however, do not become very perceptible until the third month after conception. During the three first months the os uteri is lower in the vagina, projecting forward. When the uterus has risen from the pelvis into the abdomen, its fundus leans forward, in consequence of which the os uteri is directed backward. Its margins are now soft and relaxed, and will admit the finger to a considerable depth into the cavity of the cervix. From this period the os uteri becomes further and further removed from the external parts, so that in the latter part of gestation it is reached with difficulty. The orifice at last is hardly distinguishable, appearing like an opening in a flat surface and without any elevated margin. *Montgomery's Signs of Pregnancy*, 101–2.

It is not pregnancy alone that will produce this change in the os and cervix uteri. The os uteri becomes somewhat similarly affected from the irritation of the uterus, caused by the near approach of menstruation. A diseased growth, such as a polypus or hydatids, is much more effectual in the production of this change. Although, therefore, other causes than pregnancy may be instrumental in effecting this change, yet the transverse orifice and well defined margins will always afford satisfactory evidence that the uterus is in an unimpregnated state.

From the state and condition of the cervix uteri, are drawn many important indications, not only as to the fact of the existence of pregnancy, but also as to its progress. During the first four months after conception, the cervix becomes fuller, rounder, softer, and more elastic; but no particular change takes place in its form or length. In the fifth month, the cylindrical part of the cervix begins to diminish in length, a portion of it becoming a part of the body of the uterus. Thus, as pregnancy advances, the uterus continues to enlarge, and at the same time the cervix continues to diminish; that diminution going on as its successive portions are taken up and become, by their expansion and enlargement, a part of the body of the uterus itself. *Montgomery's Signs of Pregnancy*, 104.

Changes in the uterus. The uterus begins to be developed first, at its fundus. Its capacity here is increased, to enable it to receive and accommodate the ovum. It is next developed in the body, and lastly, in the cervix. During the first three months, the degree of development is hardly possible to be ascertained. In the fourth, the fundus may be felt above the anterior wall of the pelvis. In the fifth, it rises half way between the symphisis pubis and the umbilicus. In the sixth, it rises as high as the umbilicus. In the seventh, the fundus uteri may be felt half way between the umbilicus and the end of the sternum. At the end of the eighth, it has risen as high as the ensiform cartilage, and fills the whole abdomen, which is now prominent and tense, with a projection of the umbilicus. In the ninth, the uterus continues to enlarge, but the degree of its increase is not very observable. *Ib.*, 107–8.

During the first four months, the uterus has the feel of a soft, firm, fleshy tumor, not sensitive, and of a smooth surface. From the fifth month, its distinctness is somewhat lost in its greater expansion; but in the same proportion as its parieties become indistinct, its solid contents become more easily distinguishable.

These changes in the uterus may be produced by any cause creating a distension of that organ. It becomes, therefore, important, on this account, as well as on every other, to be able to ascertain what are the contents of the uterus, and whether its enlargement is owing to fœtal development, or to some other cause. The senses of touch and hearing are those laid under contribution for the purpose of solving the problem as to the true cause of the uterine development.

During the first three months, but few indications can be drawn from the altered state of the uterus. In the fourth month, its changes in the gravid state acquire a distinctness that generally enables the practitioner to recognize them, both externally and per vaginam. Prior to examination per vaginam, the bowels and bladder should be emptied of their contents. The examination is made by the index finger, having been previously immersed in oil; and the object of its introduction into the vagina is mainly to ascertain the changes, if any, that have taken place in the os and cervix uteri. The female should be placed on her side, with the knees drawn up, and kept slightly apart with a pillow. *Montgomery's Signs of Pregnancy*, 114 – 116.

The result of this examination will only show the uterus in a state of enlargement, which may proceed from pregnancy, hydatids, polypus, dropsy, accumulated menses, or a schirrhous thickening of the substance of the uterus.

Ballotement, as the French term it, or *re-percussion*, (the English term,) has been devised to ascertain whether the contents of the uterus are fœtal or not, and in practiced hands, is a means of great value. One mode of doing this, is by placing one hand on the side of the abdomen, (the female lying supine, or on her side,) and making a pressure towards the opposite side, while the ends of the fingers of the other hand impress the uterus in the contrary direction, by means of which, the fœtus may be thrown into contact with the hand, which is kept spread on the abdomen. If the examination is made while in the supine state, or if made while the female is lying on her side, the fœtus may be felt to drop on the points of the fingers, which should be kept in close contact with the integuments. *Montgomery's Signs of Pregnancy*, 117.

Another, which is the internal method, is performed while the female is in the upright position; or, which is better, if placed lying with the shoulders much raised. The latter better enables an examination of the supra-pubic region. One or two of the fingers are to be introduced into the vagina, and carried forward and upward to the anterior portion of the cervix uteri, as high up as they can conveniently reach, and they must be kept in contact with the spot to which they have been applied. The other hand must be placed on the abdomen, over the uterine tumor, which should be pressed downwards, towards the cavity of the pelvis. Immediately upon this being done, the fingers in contact with the cervix should be impressed against it with a quick and slightly jerking motion, upwards, when something will be felt to have bounded away from the fingers, upon which it will, in the course of three or four seconds, be felt to drop again, with a gentle pat, and this proceeding may sometimes be repeated as often as we please. *Ib.*, 118.

This, if satisfactory, is conclusive proof of a fœtus in utero; but it is impossible to discriminate, by means of it, a living from a dead fœtus. It is best made from the end of the fourth to the end of the sixth month. It has sometimes failed of revealing the fact of pregnancy, although it existed at the time. Care should also be taken not to mistake the movements of the uterus for those of the fœtus, and to avoid *that*, the fingers should be kept constantly in contact with the cervix.

We now approach the consideration of another means which the ingenuity of modern times has devised, and brought to a state of comparative perfection, for discovering the uterine contents. In this the sense of hearing is employed, and it consists *in the application of auscultation, or the use of the stethescope.*

This is applied for the purpose of discovering the existence or non-existence of two facts:

1. *The souffle* or *placental sound:*
2. *The pulsations of the fœtal heart.*

The first mentioned is the one which is first capable of being examined, and may be heard as soon as the uterus is sufficiently developed for its fundus to rise above the anterior wall of the pelvis, usually in the fourth month of gestation. This is called the placental sound, from its being supposed to be confined to that part of the uterus to which the placenta is attached. *Montgomery's Signs of Pregnancy*, 120–21.

This is described as a low murmuring, or somewhat cooing sound, resembling that made by blowing gently over the lip of a wide-mouthed phial, and accompanied by a slight rushing noise, but without any sensation of impulse. The following peculiarities are to be noticed :

1. It is exactly synchronous with the pulse of the mother, varying with any variation in the maternal circulation :

2. Its situation varies not during the course of the same pregnancy :

3. Its seat in the abdomen varies in proportion to the progressive advance of the pregnancy. It will be frequently heard about the fallopian tube of the right side, but may be detected in any of the lateral or anterior parts of the uterus :

4. It is liable to intermissions.

The second fact is totally different from the first in almost all its characteristics :

1. It is heard in rapid pulsations, numbering from 120 to 160 in a minute ; and if the maternal pulse exceeds the ordinary standard, that of the fœtus will remain unaffected. These pulsations, are feeble and delicate, and resemble the ticking of a watch heard through one's pillow at night :

2. These pulsations are not, in general, heard until the end of the fifth month ; and as pregnancy advances, the sound becomes more and more distinct :

3. The source of these pulsations being the fœtal heart, their seat will, of course, vary with the varying position of the fœtus. It is, however, the most frequently heard on one side or the other, and more frequently on the left side than on the right. This last mode of examination, if successful, is the most satisfactory of all, as it discloses not only the fact of pregnancy, but also the life of the fœtus. *Montgomery's Signs of Pregnancy*, 121-2-3.

But this benefit is attended by its corresponding disadvantage, that is, if life be extinct in the fœtus, auscultation is of not the slightest value in determining the fact of pregnancy. Also from the fact that in case of life both these phenomena are occasionally inaudible, the medical jurist, if he finds them wanting, will not be justified in giving a negative opinion.

Great nicety is required in the application of auscultation. The placental sound may be imitated artificially as by pressure or by disease. Pressing the end of the stethescope over the region of the iliac arteries, may lead to deception in regard to the fœtal pulsation. The sounds sought for may sometimes be detected by the naked ear with perfect accuracy, but the use of the stethescope is preferable, and when used, the end of the instrument should be pressed down with a considerable degree of force, so as to displace any intermediate fluid, whether air or water, intervening between the ear and the source of the sound. *Montgomery's Signs of Pregnancy*, 123-4-5.

Another evidence of pregnancy has been proposed, and that is a bluish tint of the vagina, extending from the os externum to the os uteri. This discoloration is said to commence as early as the fourth week in pregnancy, to increase till the delivery and to leave only with the lochia.

It is described as being a violet color, or like lees of wine and very distinct. This must be caused by the increased vascularity of the genital system consequent upon conception, and hence causes, other than pregnancy, that produce congestion of that system must produce these same appearances. The purple hue of the mucous membrane of the vagina has been perceived at the time of menstruation. Should, however, pregnancy be found to be invariably attended by this appearance, it would be an invaluable indication as it is found at so early a period of gestation. *Montgomery's Signs of Pregnancy*, 126-7-8.

The knowledge which it is incumbent on the medical jurist to possess on the subject of pregnancy, is by no means complete without including as a part of it, the examination of substances that, under certain conditions of the uterine system, may be expelled from the uterus. These substances are four in number. 1. An early ovum. 2. A mole. 3. Uterine hydatids, and 4. False membranes. When any thing is expelled from the uterus, the proper subjects of enquiry are two in number, viz: Is the substance fœtal in its character, and if not, is it the result of conception or not?

The main fact to be arrived at is, has there been a conception and state of pregnancy?

1. *An early ovum.* A product of conception expelled within

the first month cannot be recognized. If expelled soon after the expiration of that time, it will hardly be recognized except by one acquainted with it, and who will take sufficient time to examine it. When thus expelled it is generally infiltrated with co-agulated blood, and requires to be immersed in water for a day or more, when, by agitation and washing, the coagulated blood must be removed, while with delicate blunt instruments the examiner gently separates the component parts of the mass under water, until its real character may be ascertained. This may require three or four days or even a week. If the examiner fail to discover constituent portions of the fœtus in this early period of its development, he may be able to identify the ovum by its membranes. Thus it may be covered with the decidua, characterized by its soft, rich, pulpy appearance and strong red color, with its rough external surface perforated by small foramina and its internal surface smooth, covering, either partially or completely, the substance under examination. Within this may be found the inner decidua, with its smooth outer surface, and its internal one covered with filaments which receive the arborescent villi from the surface of the chorion. *Guy's Med. Juris.*, 102–3. These are appearances that characterise the ovum, and are never exhibited as the product of disease or of morbid growth. They are, therefore, to be taken as evidence of the fact of pregnancy.

2. *Moles.* There is considerable difference of opinion as to what constitutes a mole, and about equally as great, whether it is the result of conception, or an accidental formation of a morbid character. The latter question depends very much or entirely on the former. According to the most popular opinion, every coagulum of blood which continues long enough in the uterus to assume its form, and to retain only the fibrous part, is denominated a mole. This definition would cover many cases that may exist independent of conception. But in regard to the solid fleshy masses that are occasionally expelled from the uterus, and are more properly termed moles, there is great doubt whether they ever exist except as the result of sexual intercourse. *Montgomery's Signs of Pregnancy*, 134, *et seq.*

The safer rule seems to be that suggested by Dr. Montgomery, that it would not be justifiable to pronounce any such mass expelled from the uterus a proof of pregnancy, unless there can be detected in it either a fœtus or some part of it, or some other of the component structures of the ovum ; and even then it might be possible that the placentula might have formerly remained in the uterus in an abortion not much noticed at the time, and thus have given rise to this fleshy structure.

Portions of placenta appear at times to be long retained in utero, from which they are afterwards expelled in the form of moles, when the women were advanced in life or many years widows.

3. *Uterine hydatids.* In regard to these also, there exists much contrariety of opinion, some supposing them not necessarily the result of conception, while others consider them as the product of disease attacking the ovum. The existence of hydatids in utero is always accompanied by the ordinary symptoms of pregnancy. The balance of authority is very clearly on the side that uterine hydatids do not occur except after sexual intercourse, and as a consequence of impregnation. Still there should be some doubt in pronouncing, unless some constituent part of the ovum can be detected along with them, or in case of an examination after death a true *corpus luteum* be found in the ovary. It may, however, occur that a female miscarrying in the third or fourth month of pregnancy, the placenta or some portion of the ovum is retained, and long afterwards gives rise to the production of hydatids. These may be retained for many months, and when they come to be expelled give rise to many unjust suspicions. The length of time during which they are retained in utero before expulsion has been variously stated.

In many cases they are not retained longer than seven months. But in many others they have been expelled at ten, eleven, twelve and a half, and fourteen months after conception. It also seems that they may be retained in utero many years. They sometimes are found accompanying an otherwise healthy pregnancy. In one remarkable instance a lady four or five months pregnant expelled a quantity of uterine hydatids, and subsequently, at the proper time, gave birth to the celebrated Beclard. *Montgomery's Signs of Pregnancy*, 138.

4. *False membranes or those expelled in dysmenorrhœa.* In dysmenorrhœa the female may have pains resembling those of labor, accompanied by red discharge, and followed by the expulsion of a substance somewhat resembling the decidual covering of an ovum. In these cases, however, the symptoms of pregnancy are not observed, and the occurrences are often habitual with the person at every menstrual period. The substance expelled will be found deficient in many of the characters of the true decidua. It is a morbid product, and is not furnished with a structure such as would only be required for the performance of the office of furnishing nutrition to the ovum. The balance of authority is here very clearly on the side that the production of these membranes is referable entirely to causes independent of intercourse, and they are not therefore the results of conception.

It may sometimes become necessary to examine the uterus and its appendages after death, with the view of determining the existence or previous occurrence of pregnancy. The first thing that will naturally occur to the examiner in regard to the uterus will be to observe its size and vascularity. If found of its ordinary diminutive size it is clearly in a virgin state. If enlarged and vascular, its contents should be carefully examined. If the ovum be detected, or any of its component structures, or any clear and well defined portions of a fœtus, no doubt can remain but that pregnancy was present.

But the uterus may be found enlarged and empty, exhibiting increased vascularity, and several of the changes which accompany gestation. Its contents may have been expelled, and the appearances remaining, together with the structural changes that may be present, may be insufficient to enable the examiner to arrive at any clear conclusion as to the fact of pregnancy. We may not be able to derive from the uterus itself a satisfactory answer to the enquiry. But what it fails to furnish may, perhaps, be derived from its appendages. *Montgomery's Signs of Pregnancy*, 213–14.

The appendage of most value, and to which reference should be had in all such cases, is the *ovary;* and the attention should be directed to that part of it, if it exist, called the *corpus glandulosum* or *corpus luteum.* Amid the uncertainties that so constantly attend organic phenomena, especially those connected with the mysterious processes of generation, it is truly delightful to find any one thing that is fixed, certain, and reliable. It is claimed, that the true *corpus luteum* is an infallible evidence of conception, and the want of it within certain limits of time, as reliable evidence that there has been no conception. It is true, the medical profession are not all united as to the conclusiveness of this evidence. The whole subject is very thoroughly considered, and the authorities making for and against it, are very ably reviewed in Dr. Montgomery's work on the signs of pregnancy; and the conclusion he arrives at, from all the authorities, and from his own very extended experience, is to affirm the truth of both of Haller's propositions, viz., the one, that *conception never happens without the production of a corpus luteum;* and the other, that the *corpus luteum is never found in virgin animals, but is the effect of impregnation. Montgomery's Signs of Pregnancy*, 244.

If this be so, as the strong balance of authority seems to have very satisfactorily settled, it is of the highest importance that the phenomena attending the corpus luteum should be thoroughly understood.

The *corpus luteum* is the place or spot in the ovarium from whence the impregnated ovum has proceeded. The ovum is found, originally, contained in the *graafian vesicle*, and is surrounded by two membraneous envelopes, the outer one of which is the stronger, and gives transmission to several blood vessels, passing to the inner, which is softer and more vascular.

Immediately upon conception, there is a determination of blood to the ovary and vesicle, the coats of which become pervaded by a very fine net-work of vessels. The consequence is, that the vesicle itself increases in size, and becomes a kind of temporary uterus, performing an office analogous to that which is afterwards discharged by the uterine decidua, and subsequently still, by the placenta. The ovum is discharged by the bursting of the coats of the vesicle.

After the escape of the ovum, there is a cicatrix, or appearance as of a rent imperfectly united. The peritoneal coat around it appears abraded, and a twining of the vessels there is distinctly observable. In the centre, there is a cavity filled with coagulated blood, and surrounded by a yellowish organised substance.

The peculiar appearances that mark the corpus luteum are more distinctly observable in the earlier periods of pregnancy. The central cavity is then much more apparent, and there are stronger evidences of vascularity and vital action.

The true corpus luteum is distinguishable,

1. *By its color.* That is a dull yellow somewhat similar in appearance to the buffy coat of the blood :

2. *By its form.* That is oval or fabiform :

3. *By its size.* This depends on the size of the Graafian vesicle; upon the rapid or retarded closure of the central cavity; and upon the degree of vascular activity existing at the time. It is largest during the earlier periods of pregnancy, gradually diminishing afterwards, slowly during gestation, more quickly after delivery. Its size will be found to be in the inverse proportion to the time elapsed after conception. It usually occupies from one-fourth to one-half the area of the ovary. At the end of two months it has been found to measure in length 9½ lines, in breadth 8 lines, the central cavity being three lines by two, and the average thickness of the glandular structure from 3 to 3½ lines. In the sixth month the longer axis was 6 lines, the shorter 5, the thickness 3, and the central cavity 2 by 1. In the ninth month the longer axis was 5 or 6, and the shorter 4 or 5 :

4. *By its structure.* This is glandular, presenting a lobulated appearance. Slight convolutions are traceable like a section of a kidney, or that part of the brain called the centrum ovale :

5. *By its vascularity.* The vessels run from the circumference to the centre. If the spermatic vessels going to the ovary be injected, the vessels of the corpus luteum will be filled with coloring matter :

6. *By the appearances presented at its centre.* These are either a cavity or a white line. Up to the end of the fourth month, and sometimes later, is to be found the cavity. It has never

been found open after the sixth month. The white line is formed by the closure of the inner coat of the vesicle.

After the termination of the period of gestation, or of the expulsion of the contents of the uterus, the corpus luteum begins to alter in its character, until it is no longer found in the ovary. The exact time of its disappearance is unknown, but it has not been found later than the end of five months after delivery.

It has been supposed by many that the corpora lutea are permanent, and that their number indicate the number of conceptions. This is an error. Their number is always the same as that of the fœtuses lodged in utero in one gestation. There may sometimes be found a greater number of corpora lutea than of foetuses born. In such cases one or more to make up the number are aborted.

There may be a smaller number of corpora lutea than of fœtuses born, as a single vesicle is sometimes found to contain two ovula. There may, therefore, be twins with but one corpus luteum.

The birth of a child is not necessarily inferrible from the fact of finding a corpus luteum. The only necessary inference is that conception has taken place. But the ovum may have been blighted or destroyed, or converted into a mole or hydatids.

A cicatrix on the surface of the ovary must not be mistaken for a corpus luteum, such may occur as the result of inflammation or of small abscesses.

The difference of opinion among members of the profession, in regard to the conclusive character of the evidence furnished by the presence of the corpus luteum, has probably originated from the fact that there are sometimes appearances resembling corpora lutea, which have, nevertheless, no other real affinity with the true ones than a similarity in color. These spurious or false corpora lutea are supposed to be formed by an accidental or morbid determination of fluids towards a vesicle, by which it becomes distended with fluid, and sometimes bursts and discharges its contents, in which event an external cicatrix is found.

Sometimes instead of bursting and discharging, the fluid is absorbed. In either case, there is often found deposited on the inner surface of the vesicle, a substance resembling the true corpus luteum in color, not more than one sixteenth of an inch thick, much smaller than the real ones, and lacking all their essential characteristics, with the single exception of color.

The following are the principal points of difference between them. The spurious ones differ from the real ones in that.

1. There is no prominence or enlargement of the ovary over them:
2. The external cicatrix is almost always wanting:
3. There are often several of them found in both ovaries:
4. There is no trace of vessels to be found in their substance, and hence there is no possibility of injection:
5. The texture is infirm, never presenting the soft, rich, lobulated, glandular appearance of the true corpora lutea:
6. In form, they are often triangular, or square, or some figure bounded by straight lines.
7. They never present the central cavity, or the radiated stelliform white line, which is the result of its closure. These several points of difference will enable one to distinguish the spurious from the true, without the danger of confounding them together.

In regard to the formation of the false corpora lutea, Dr. Paterson remarks, that they may arise—

1. From the bursting and subsequent filling of a vesicle with blood, as in menstruation:
2. From partial effusion of blood into a vesicle, either with or without rupture of it:
3. By re-absorption of the fluid of a morbidly enlarged graafian vesicle, giving rise to a puckered cyst:
4. From effusion of blood into the tissue of the ovary, the apoplexy of the organ:
5. From tubercular deposits, and,
6. From cysts filled with yellow, fatty matter. *Guy's Principles of Forensic Medicine*, 106.

On the trial of Angus, reported in 1 *Beck*, 219, *et. seq.*, it was important, under one count in the indictment, to make out the fact of recent pregnancy. There was much conflict of opinion in relation to it; but the discovery of a corpus luteum was deemed sufficient to settle the question in its favor.

It remains to consider some questions of a medico-legal character, that may arise for investigation. Of these, we shall notice,

1. *The age*, or period in the life of the female, within which conception may occur. The limits of the generative faculty in women, are generally those of the function of menstruation. This differs in different climates. *Guy*, 106. In warmer climates, it occurs earlier than in colder.

Dr. Montgomery, speaking in reference to the British climate, assigns as their limits the fifteenth and forty-fifth year. *Montgomery's Signs of Pregnancy*, 160.

Dr. Beck says, that in our climate, a female, not previously barren, cannot, in general, be impregnated under thirteen years of age, nor beyond fifty. 1 *Beck's Med. Juris.*, 182.

In Abyssinia and Bengal, mothers are found of the age of eleven years. Whatever may be assigned as the general rule, on this subject, it is obvious it can never be received except as subject to many exceptions. These exceptions apply to both the limits of this term.

About the year 1828, a lady was to be seen at the Ballston Springs, who was a grandmother at not quite the age of twenty-eight years. In the *Transylvania Journal, vol.* 7, 447, is recorded a case of menstruation at one year, and of pregnancy at nine.

On the other hand, pregnancy seldom takes place beyond fifty; but instances of a very extraordinary nature have been noticed, in which it has been found to occur considerably beyond that period, in women who had formerly borne children. Instances are cited from Capuron and others, by Dr. Montgomery, in which pregnancy occurred at the age of 60. *Ib.*, 165.

A case is mentioned in the *Boston Medical and Surgical Journal*, of a woman at Whitehall, (New-York,) becoming a mother at 64. *Guy's Principles of Forensic Medicine*, 99.

From a great number of cases that have been collected, the age of fifty-four has been fixed upon as the probable limit of fruitfulness; although no one can deny the possibility of its being extended beyond that period. *Ib.*, 100

In a recent case argued and decided in the English Court of Chancery, a large amount of property hung upon the single issue whether a woman might have a child at sixty years of age. The attorney general challenged the production of a single well recorded instance of a woman's having a child at that age. No such instance was produced, and he succeeded. *Montgomery's Signs of Pregnancy*, 165–6.

There sometimes occurs what has been called a spurious pregnancy, which should be understood, in order to be able to discriminate between it and a real one. This is often observed about the turn of life, when the menses become irregular, being not unfrequently suppressed for a few periods prior to their final cessation. The stomach, at the same time, is generally out of order, nausea and vomiting experienced, the breasts enlarge, and often become sensible, and even slightly painful. Sometimes a serous or sero-lactescent fluid exudes from the nipples and orifices of the areolar tubercles. The abdomen, at the same time, grows fuller and more prominent; the enlargement progressively increasing, owing, in part, to a deposition of fat in the integuments and in the omentum; but more, still, to a distension of the intestines, by flatus, which, passing from one part to another, communicates a sensation like that produced by the motions of the fœtus. All this is frequently accompanied with a disturbed state of the nervous system, the woman herself being firmly convinced of her pregnancy. As if to render the delusion complete, at the end of the supposed gestation, periodical pains frequently occur, strongly resembling those of labor.

Although this generally takes place at the turn of life, yet it is not confined to that period, but has also been met with in young women, and those who had borne children both before and afterwards. Several instances of this are given by Dr. Montgomery, in his Signs and Symptoms of Pregnancy, pages 170–71, &c.

These phenomena are not even confined to the human species, but have been observed in the lower animals, particularly in the dog species. It cannot, therefore, be attributable to the imagination.

In cases of this kind, and where it becomes necessary to discriminate, little reliance can be placed upon most of what we have termed the constitutional signs and indications of pregnancy. We are to trust, principally, to a careful manual examination, by which the abdomen, however enlarged, is found to be soft, puffy, and compressible; the umbilicus sunk; no abdominal tumor; and the uterus, when examined per vaginam, is found unaltered.

It is sometimes the fact, that pregnancy is found complicated with disease, in such a manner, that much difficulty is experienced in determining its existence. This is more particularly the case with those diseases that increase the size of the abdomen, especially dropsy. The difficulty in deciding, is greater in those cases where the dropsy existed previous to impregnation; because, in such a case, the system is so disturbed before conception, that the natural sympathies and changes which should follow that occurrence, are either prevented from taking place, or are so imperfectly manifested, or actually disguised, by the pre-existing disease, that they are incapable of being recognized. In the majority of cases, however, it supervenes on pregnancy, when its usual indications are more marked, and less doubt and difficulty is realized in forming a conclusion.

Other cases may present themselves, of an embarrassing character, where the uterus contains morbid growths, such as hydatids, and moles. In those cases of pregnancy in which hydatids, or a mole, are formed, many, or most, of its usual signs are generally present, accompanied with irregular uterine discharges, and a distended uterus; but its contents are not disclosed to us until some of the hydatids, or a mole, are discharged. There are, it is true, several points of discrimination, but they all occasionally fail. In many instances of hydatids, the uterus has been observed to acquire, quickly, a size quite disproportionate to the period of pregnancy, and to be at the same time much softer than usual; but both these circumstances are subject to great variety. Occasionally, also, in the case of hydatids, there is the discharge from the uterus, of an almost colorless watery fluid. *Montgomery's Signs of Pregnancy*, 180–81.

The only rule that Dr. Montgomery thinks can be laid down with safety, is, "that if the woman, after experiencing the ordinary symptoms of pregnancy up to the third or fourth month, is observed to be growing large with unusual rapidity, so that her size corresponds to a period much more advanced than her pregnancy really is, or is supposed to be, and she then becomes affected with irregular discharges from the vagina, sometimes of blood and at other times of water, and, although perhaps the sixth or seventh month has arrived, no motion of a fœtus has been perceived by her, nor can it be felt by any mode of manual examination, or re-percussion, but the uterus is ascertained to be distended, and feels as if it were filled with something of a gelatinous consistence, the case *is likely* to prove, eventually, one of hydatids.

But if, in conjunction with the same combination of collateral symptoms, the uterus be found of unusually firm consistence, irregular in form, and painfully sensitive, the case will probably terminate in the expulsion of a solid, or fleshy mole; but that these can only be received as general rules, liable to very numerous exceptions." *Montgomery's Signs of Pregnancy*, 181 – 2.

Another disturbing element, is the formation of tumors, particularly of the hard, fibrous kind, which, if they happen to be large or numerous, very much complicate the condition of pregnancy, and greatly disguise its result.

In such cases, a manual examination may detect the fœtal motions, or auscultation may reveal the true nature of the case. All the usual signs and indications of pregnancy must be particularly noticed, especially the mammary changes, and the areola.

2. A second medico-legal question is, can a woman conceive while in a state of unconsciousness? This question was formerly considered while on the subject of rape, and any further discussion of it here is deemed unnecessary. From the instances that have actually occurred, it may now be considered as well settled, that with married women, or those accustomed to sexual intercourse, it is possible to have such a connection as shall lead to a fruitful result, while they are in a state of unconsciousness, produced by deep sleep or the action of narcotics upon the system. This effectually disposes of the ancient doctrine, that consent and

pleasurable sensation on the part of the woman, are conditions necessary to conception. It also goes to show further that conception, when the physical conditions under which it takes place are complied with, is a result entirely independent of the volitions of the sexes :

3. A third medico-legal question is, can a woman remain ignorant of her pregnancy up to the time of delivery ? Three classes of cases may here be presented. The first will include all those cases where conception occurred without consciousness, and where of course all the symptoms of pregnancy will be likely to be attributed to any cause but the true one.

The second class includes those where the female has yielded to the solicitations of the male in consequence of solemn assurances that, under certain circumstances, connexion may take place without danger ; as in the case of the female who yielded to the solicitations of her seducer in a bath, under solemn assurances from him, that, under those circumstances, no conception could take place. In this class there is more or less weakness of intellect. There would be the same tendency as in the other to refer the symptoms of pregnancy to some other cause than the true one.

In the third class are included all those who are conscious of having been exposed, and are laboring under no delusion in reference to any supposed exemption from the probable results of the exposure.

Those of the first and second class may be very likely to refer any changes they experience to a state of disease, and thus remain honestly ignorant of their real condition up to nearly or quite the time of their delivery. Those of the third class may by possibility persuade themselves that the changes are the results of disease, but their consciousness of exposure must certainly give rise to many misgivings in their own minds on the subject.

A very interesting trial took place in Monroe county, New-York, in 1842, in which the facts as alleged were that Miss Sophia Murdock, a young lady of fifteen years of age, had a single connexion with a clergyman, in his study, in his own house, in the daytime. She had no connexion with any other, and never divulged it until concealment was no longer possible. The questions raised were—

1. Whether it was possible to have complete connexion with a young virgin on the first attempt, and whether a first and sole connexion could result in impregnation?

2. Whether in such case it would not always be attended with pain, and the usual signs of forcible defloresceuse?

3. Whether a woman could be unconscious of her pregnancy until within five or six weeks of the usual period of gestation, and whether two hundred and ninety-two days intervening between the alleged intercourse and birth of the child, would render an impregnation, at that period, improbable?

There was considerable contrariety of medical testimony upon these points. Dr. J. W. Francis stated that both the facts embraced in the first question were possible. That the second was among the possibilities, but was improbable. In regard to the third, that it was not probable that a woman conceiving for the first time should remain thus unconscious, nor that she should go beyond the nine months, the usual period, as first pregnancies more commonly fell short of it.

A number of other physicians concurred in stating that there were variations of time in the period of pregnancy, the first, however, being more likely to fall short than to exceed the ordinary time, viz., two hundred and eighty days. That they were aware of no physical impediments that should preclude conception from following the first coition, although the probabilities were against it. That they knew of no reason why conception might not follow when the connexion was forcible, as the mind, in their opinion, had nothing to do with the matter.

The result was the conviction of the defendant, although an ecclesiastical court subsequently, and after a very full investigation, pronounced a judgment of not guilty.

There is little doubt but that there are many instances occurring, both in the virgin and the married state, in which conception has resulted from a single act of intercourse. So also from the well known fact, that, in some instances, the motions of the fœtus in utero are never perceived by the mother, and that the ordinary symptoms of pregnancy vary very much in different individual cases, being sometimes many of them obscured, and some not appearing at all; it may be readily supposed that there may be cases where the female will remain ignorant up to a very late period of gestation. *Guy's Principles of Forensic Medicine*, 81, *et seq.*

4. A fourth medico-legal question relates to the possibility of *superfœtation.* This is defined as the conception of a second embryo during the gestation of the first, the products of the two distinct conceptions being born either at the same or at different times. This question has a bearing upon legitimacy, and in that view only becomes important to be considered in medical jurisprudence. Upon the possibility of this the medical profession are not probably as much divided in opinion as they once have been. The ancient physiologists were very generally believers in it. In modern times much scepticism is entertained in relation to it.

Those who doubt, or deny it, urge as reasons,

1. That shortly after conception the os tincæ, as also the internal apertures of the fallopian tubes, are closed by a thick tenacious mucus:

2. That the *deciduan membrane*, which is formed soon after conception, lines the uterus, and aids in obliterating the openings into its cavity:

3. That when the uterus is impregnated, the fallopian tubes, instead of running horizontally to the ovaria, lie parallel to the sides, so that if a second embryo were formed within the ovarium, the tubes could not embrace it in order to convey it to the uterus:

4. The arrival of a new embryo in the uterus, would prove destructive to the first, inasmuch as the functions which have already been performed for the first conception, would have to be repeated, and an additional decidua and placenta would have to be formed.

To the first two objections it is answered that neither the mucus, nor the decidua, adhere so firmly to the orifices and cells of the uterus, as to exclude the passage of the *aura seminis*, or even the semen itself. That the fact of the occasional occurrence of the menstrual discharge during pregnancy proves this. To the third objection it is answered that although this obstacle may exist in the fully developed uterus, yet that in the early stage of utero-gestation the ovary and fallopian tubes are not in the least prevented from coming into contact with each other, and that it is only during that early stage that superfœtation is alleged to take place. The answer to the fourth objection is, that it is founded too much on assumption alone to require any particular reply. *Guy's Principles of Forensic Medicine*, 113 – 14.

In the alleged cases of superfœtation that have, at different times occurred, reference may be made to 1 *Beck's Med. Juris.*, 194, *et seq.*

One case occurred in Charleston, South Carolina, in 1714, and was that of a negro woman who was delivered of twins within a very short time, the one of which was found to be black, and the other white. This led to an investigation, in which it turned out, that she had been compelled, by threats, to suffer the embraces of a black man immediately after her husband had left her bed. A case very similar to this occurred in Jamaica, where a negro woman brought forth two children at a birth, nearly of a size, the one being a negro and the other a mulatto. This, on investigation, had the same explanation as the other. These and all others of a like character, are obviously not cases of superfœtation, but simply of twins.

There is also another class of cases where the birth of two children is separated by a short interval, or by an interval corresponding to their respective size and degree of development, so that the fact that their conception took place about the same time, is by no means excluded. Such, for instance, is the following.

Eight months after the husband's death, the widow was delivered of a deformed child, which did not survive its birth. One month and a day thereafter she was delivered of a perfect living child. The husband's relations contested its legitimacy, on the ground that it was the result of superfœtation, and Zacchias was consulted.

He decided it to be a case of superfœtation, and supposed that the first was the product of a superfœtation, and conceived a month after the other. There seems little reason for this conclusion. The most reasonable explanation of this would seem to be, that it was a case of twins conceived at the same time, but of which one was discharged before the other. *Guy's Principles of Forensic Medicine*, 110–11.

Very many of the cases recorded as instances of superfœtation belong to the last mentioned class of cases. In cases of twins the growth of one, may, from some cause or other, happen to be retarded, while that of the other proceeds at the usual rate of development.

There is still another class of cases more difficult of explanation. Of these, the following is an instance.

A woman in Lyons married at 22, became pregnant five years thereafter, but had an abortion at the 7th month, and on the 20th May, 1779. She conceived within one month thereafter, and on the 20th January, 1780, eight months after her delivery, and seven months from her second conception, she brought forth a living child.

Her delivery at this time was not accompanied with the usual symptoms. No milk appeared. The lochia were wanting, and the abdomen did not diminish in size. An examination was had, when it was declared by Dr. Desgranges that she had a second child in the womb. Three weeks after this delivery, she quickened, and on the 6th July, 1780, five months and sixteen days after the first birth, she was again delivered of another living daughter. The milk now appeared, and she was enabled to nurse. *Guy's Principles of Forensic Med.* 111–12; 1 *Beck's Med. Juris.* 196–7.

There is also another well authenticated case in which two male children, both born perfect, were brought forth at an interval of nearly three calendar months. There are also other cases to be found in writers on Medical Jurisprudence. The clearest instance is probably that of the woman of Lyons. The instances are possessed of little value as proving superfœtation, unless the interval between the births is considerable. If the interval be small, it may be accounted for by the difference in maturity between the children. In the instances recorded there has not perhaps been a sufficient amount of observation made upon the size or the mature and immature condition of the children born. The products of the conception may differ greatly in size and yet both be healthy children.

As an explanation of those cases that seem the most strongly to make out superfœtation, like that of the woman of Lyons, it is urged that there are occasional cases of double uteri, and that this peculiarity of formation probably existed in those remarkable cases. There are many instances of the occurrence of these double uteri. A long enumeration of them may be found in 1 *Beck's Med. Juris.* 199–200. They are more numerous than the instances that have been recorded of superfœtation. In some of them, not only were found double uteri, but also double vaginæ. There is one recorded instance in which superfœtation actually occurred where, on examination, the uterus and vagina were both found double, each vagina having a separate orifice. Other cases may have depended on the same malformation.

Amid the doubt and uncertainty that now rests on the subject, the conclusion arrived at by Dr. Beck is probably the safest, viz: that should this doctrine arise in medico-legal cases, we must be guided by the laws of legitimacy, both as to premature and protracted births. The latest born should fall within the legal term, or be excluded from the privileges attendant on it. 1 *Beck's Med. Juris.* 201–2.

V. LEGITIMACY.

Under this head often arise questions of both a difficult and delicate nature. The law of England, and of this country, regards the illegitimate as nullius fillius, as possessing no inheritable blood, and as utterly excluded from any participation either in ancestral honors or property. This wide difference which the law creates between the legitimate and the illegitimate, invests all questions of legitimacy with a high degree of interest.

The general rule of the law is, that all children born in lawful wedlock are legitimate. The law, it will be noticed, regards the *birth*, not the *conception*, as the test of legitimacy.

Again the legal presumption is that the husband always has access to the wife, so as to render him the father of any child born in wedlock. This, however, like any other presumption, may be rebutted by proof; and hence in contested questions of legitimacy, it is competent to prove impossibility of access on the part of the husband; or the fact of impotence; or any physical defect going to show that the act of intercourse was impossible.

There is one case in which the law inclines particularly to favor offspring on the score of legitimacy. The rule as laid down by Blackstone and Coke is—that if a man dies, and his widow soon after marries again, and a child is born within such a time as that, by the course of nature, it might have been the child of either husband, in that case, he is said to be more than ordinarily legitimate, for he may, when he arrives at years of discretion, choose which of the fathers he pleases.

There are several occasions where this question will arise; as where a wife gives birth to a child more than nine calendar months after the absence or death of her husband. The point here to be settled is whether the period of utero-gestation can be so extended beyond the usual time, as to render this the child of the absent or deceased husband. So again a woman at an unusually short period after her marriage may give birth to a child, when the question may arise as to how short a period of utero-gestation a child may be born, possessed of sufficient power to be reared to maturity. Again, it may become necessary, if a child is born in the seventh or eighth month after marriage, and presents the appearance of a child having gone the full term, to examine carefully its state of growth and maturity, in order to draw a conclusion as to what has been the actual period of utero-gestation.

The most important question involved in the consideration of this subject is the *duration of pregnancy.* This has what is termed *its usual period*, which is nine calendar months, ten lunar months, forty weeks, or two hundred and eighty days. There is, however, a difference between nine calendar months on the one hand, and ten lunar months, forty weeks, or two hundred and eighty days on the other; as the nine calendar months may consist either of two hundred and seventy-three, two hundred and seventy-four, two hundred and seventy-five or two hundred and seventy-six days, thus falling short a few days of the two hundred and eighty.

Blackstone says—from what has been said it appears, that all children born before matrimony are bastards by law; and so it is of all children born so long after the death of the husband, that by the *the usual course of gestation* they could not be begotten by him. But this being a matter of uncertainty, the law is not exact as to a few days. 1 *Blackstone's Com.* 456.

This leaves it as a question of fact to be settled in each contested case by medical testimony. In the settlement of this question, one of the limits of this period is clearly ascertainable, viz: that of the birth of the child. The other, that of its conception, is, in most cases, involved in a very considerable degree of doubt.

There are commonly reckoned four means of ascertaining the time of conception. These are,

1. Peculiar sensations experienced by the mother:
2. Cessation of the menstrual discharge:
3. The period of quickening:
4. A single coitus.

No dependence can be placed on the first, for the reasons, that these sensations are not defined, so that those conceiving for the first time could recognize them. They are not constant in their occurrence in the same female, and they do not take place at any particular time. *Guy's Principles of Forensic Medicine*, 200.

The second means mentioned is undoubtedly the most relied upon; but to this there are great objections. Their irregularity in many respects was noticed while on the subject of pregnancy.

At best, there is an interval occurring between the menstrual discharges, of nearly twenty-eight days, on any one of which, conception may take place. This shows that although the suppression may be evidence of the fact, yet only an approximative result can be arrived at. The time generally assumed, is the middle point of time between the last discharge and the time when it would have again recurred had not pregnancy supervened. Some calculate from the first week after the cessation.

As to the third means, the period of quickening, that is much more variable than the one last mentioned. According to the best authorities, it has a range of six weeks, and according to others, of sixteen; so that it could be very little relied upon as a basis for calculation.

The fourth, a single coitus, presents, really, the only sure basis of calculation. This, however, must be of very unfrequent occurrence. Dr. Guy has collected seven cases, in all which, the average was found to be two hundred and eighty-four or two hundred and eighty-five days; the minimum, two hundred and seventy-three, or two hundred and seventy-six; the maximum, two hundred and ninety-two or two hundred and ninety-three. The range was found to be sixteen, seventeen, nineteen or twenty days. The excess over two hundred and eighty was twelve or thirteen days. *Guy's Principles of Forensic Medicine*, 201.

From these few facts, it may be easily collected, that there is no fixed period of utero-gestation, but that all is subject to a greater or less degree of variation. This receives strong additional confirmation from the facts collected, and observations made, by M. Tessier and Lord Spencer, in reference to the period of gestation among animals. These were principally made in reference to the cow and horse, and the results arrived at showed that there is much more variation in both these, in the period of utero-gestation, than has ever been noticed in the human species. *Ib.*, 202 – 3.

It furnishes, also, a very good reason why we should expect to find the period of utero-gestation a variable period, that all the functions of the human body, that have been carefully examined, such as the pulse, the respiration, the secretion of urine, the cutting of teeth, &c., are all variable, and sometimes vary within wide limits.

It is also a fact, that those who advocate a fixed period, are unable to agree among themselves as to what that period shall be. Although they all agree that it is fixed, yet each names a different period of time, varying from thirty-seven to forty weeks. *Guy's Principles of Forensic Medicine*, 203–4.

Premature Birth.

Suspicions are sometimes entertained that the period of birth, and the development of the fœtus, do not correspond to the period which ought to have been that of gestation, dating from the time of the marriage, or the return of the husband after a long absence. Some have considered this as embracing the question of viability, or the earliest period of time at which it could be born and reared up. But this question does not appear to arise here. It is the comparison between the state of the infant at birth, as to its maturity or immaturity, and the alleged period of gestation, that is here presented to the medical jurist, and upon which his conclusion is to be founded.

There are some women to whom it is peculiar, always to have the time of delivery anticipated by two or three weeks, so that they never go beyond the end of the thirty-seventh or thirty-eighth week, for several pregnancies in succession. *Montgomery's Signs of Pregnancy*, 264.

This should be borne in mind, as also the further fact that great variety is constantly observable in the size, weight, strength and appearance of children at the full time. Most of them weigh from six to seven pounds, while occasionally we meet with instances where they are double that weight. This should induce a caution in determining, especially where the period has advanced to within a month of its usual termination. The indications of maturity and immaturity will be considered under the head of delivery.

In 1838, occurred the case of the Rev. Fergus Jardine, before the Scotch Presbytery, which arose upon a charge made against Mr. Jardine, for having committed fornication with his wife before marriage. He was married on the 3d of March, 1835, and on the 24th of August following, Mrs. Jardine was delivered of a girl. This, reckoning from the day of marriage, was only 174 days, or five calendar months and twenty-one days over. The infant survived nearly seven months and then died.

The weight of the child at birth was three pounds, but few observations were made relative to its maturity or immaturity. Fourteen medical witnesses, among whom was Dr. Christison, were sworn. It appeared that the mother had menstruated as usual the week before her marriage; that she was both before and after in a very weak state of health; that she was herself a seven months child, and that she had a second child which she believed to have been born at the commencement of the eighth month of her pregnancy. The case was a puzzling one to the Scotch Presbytery, but it finally resulted in their finding the libel "not proven." *Guy's Principles of Forensic Med.*, 208 – 9.

Dr. Montgomery has thought it important to notice that from the results of accident, or the existence of disease in some of the structures of the ovum, especially in the placenta, the size and external characters of the fœtus may not correspond to the real period of gestation; and that for the reason, that, in consequence of the diseased condition of the medium of support, an insufficient and unhealthy nutrition is afforded to the child, by which both its growth and natural development are retarded so much, that, at a given period, it will be found to present appearances properly belonging to a much earlier period of intra-uterine life. *Montgomery's Signs of Pregnancy*, 259.

Protracted Gestation.

Many cases have arisen in the course of judicial proceedings, involving the question whether the period of gestation had a fixed limit, or was capable of being protracted beyond the usual term; and in some cases the further question how far such protraction could, by possibility, reach.

The opponents of protracted gestation urge, that the laws of nature on this subject are immutable; that the fœtus, at a fixed period, has received all the nourishment of which it is susceptible from the mother, and becomes, as it were, a foreign body; that married females are very liable to error in their calculations; that the decision of tribunals in favor of protracted gestation cannot overturn a physical law; and finally, that the virtue of females in these cases, is a very uncertain guide for legal decisions. They deny that experience shows that the children of old people are any longer in coming to maturity than any others.

They deny also that grief and the depressing passions possess or exercise any delaying power, insisting that they are more apt to produce abortion than protracted gestation. They urge that married women, usually basing their calculations upon suppression of the menses, may be mistaken from the fact that they may be suppressed not only from disease, but also from affections of the mind, or accidental causes which do not immediately impair the health; while the increase of volume in the abdomen may originate from this, or from numerous other causes. They also suggest a difficulty in distinguishing a delayed child from one that is born at nine months, as the evidences of delay or protraction, so far as regards the appearances about the child, do not seem to be clearly settled. 1 *Beck's Med. Juris.*, 461 – 2.

In answer to these, besides the arguments already alluded to, it is urged that experiments prove that the impregnation of the ovum does not take place immediately upon the act of intercourse, but that a greater or less portion of time elapses between that act and the communication of the vivifying influence to the germ in the ovary; leaving it probable, almost certain, that a variety of physical, and perhaps moral causes, may operate to cause delay in the impregnation.

After impregnation the ovum is transferred from its seat in the ovary along the fallopian tube into the cavity of the uterus. Here also it is urged that every successive step in the progress of this transfer is liable to interruption. The ovulum may lie deeper than usual in the substance of the ovary. The texture of the latter may be thickened and indurated. There are also, says Mr. Burns, some causes that we cannot explain or discover, that have the power of retarding the process, the woman carrying the child longer than nine months; and the child when born being not larger than the average size. How long, he remarks, it is possible for labor to be delayed beyond the usual time, cannot be easily ascertained.

It is also urged that the weight of authority in the medical world is decidedly in favor of the possibility of protracted gestation. Among the names found in favor of it are those of Buffon, Burns, Capuron, Denman, Desormeaux, Dewees, Foderè, Gardien, Haller, Hamilton, Harvey, W. Hunter, La Motte, Lebas, Leroy, Levret, Mauriceau, Merriman, Murat, Petit, Richerand, Roussel, Smellie, Velpeau, and Zacchias, besides many others of no inconsiderable authority. *Montgomery's Signs of Pregnancy*, 269–70, and 271.

Petit informs us that many faculties of medicine, forty-seven celebrated authors, and twenty-three physicians and surgeons, concluded pregnancy might be protracted to the eleventh or twelfth month.

It is also urged that the laws of most civilized countries admit the possibility of protracted gestation, thus showing that legislators, and the common sense of the community, have favored this idea. Thus the law of France provides that the legitimacy of a child born within three hundred days after the death or departure of the husband shall not be questioned, and one born after that lapse of time may have its legitimacy contested.

The Prussian civil code declares, that an infant born three hundred and two days after the death of the husband shall be considered legitimate.

The Scotch law provides that to fix bastardy on a child, the husband's absence must continue till within six months of the birth, and a child born after the tenth month is accounted a bastard.

The English and American law fixes no precise limit, but whenever the question has arisen for judicial determination, the decisions have always favored the possibility of protracted gestation. *Montgomery's Signs of Pregnancy*, 277.

There are some very extraordinary cases on record, which have been adjudged to be cases of protracted gestation. In 1638, a female brought forth a child one year and thirteen days after the death of her husband. She had labor pains during the whole previous month, and the parietal bones of the infant at birth were united. She had previously borne seven children, and had always been irregular in her calculations. The medical faculty of Leipsic being consulted, replied that there might be a frigidity of the genital organs, so as to cause a slow increase of the fœtus; and that the long continuance of the labor pains proved this to be a preternatural case. They decided that the offspring was legitimate. 1 *Beck's Med. Juris.*, 458.

A great number of cases are cited by Dr. Montgomery, and by Dr. Beck, in his chapter on legitimacy; the former principally from the statements of physicians and the works of medical writers, and the latter of cases that had arisen for investigation in judicial proceedings, all going to demonstrate the possibility of protracted gestation. The former remarks, in reference to the cases cited by him, that those appear to carry with them the fullest demonstration of their truth, in which the ordinary term was not extended by more than three or four weeks. *Montgomery's Signs of Pregnancy*, 271.

A brief reference to a few cases that have been judicially investigated, in which this question has arisen, and also on questions of contested paternity, will conclude the present subject.

The case of *Foster and others* vs. *Cook*, reported in 3 *Brown's Chancery Cases*, 349, occurred in the English Court of Chancery. "Cook died on the 15th January, 1780, and on the 9th November next following, (forty-three weeks wanting one day,) his widow was delivered of a son. This posthumous child was held to be the heir at law."

The case termed the *Gardner Peerage Case*, is a leading case on this point, and much more celebrated than any other. The facts briefly are, that Capt. Gardner, afterwards Lord Gardner, married Miss Adderly in 1796. They lived together until 30th January, 1802, when he went to the West Indies, and returned to England on the 11th July following. For some time before, and during his absence, Mrs. Gardner carried on an adulterous intercourse with one Henry Jadis. On the 8th December, 1802, Mrs. Gardner was privately delivered of a male child, which was christened by the name of the paramour, and brought up and treated as his son. Capt. Gardner subsequently obtained a divorce on the ground of the adultery of his wife, and married again. He succeeded to the peerage in 1808, and died in 1815, leaving a son by his second marriage, who was a minor. In the year 1824, this son presented his petition to the King, praying to be entered on the Parliament roll as a minor Peer. In this he was opposed by Henry Fenton Jadis, alias Gardner, who claimed to be the eldest son of Lord Gardner, and therefore entitled to the peerage.

In this case there were two principal questions proposed to the medical witnesses:

1. Could a child, born on the 8th December, have been the result of sexual intercourse either on the 30th January, or anterior to it, being 311 days?

2. Could a child, born on the 8th of December, and living to manhood, have been the result of sexual intercourse on or after the 11th of July, a period of 150 days, or two or three days short of five calendar months?

Thus, if the child were legitimate, he must have been either a five months child, or a three hundred and eleven days child. The first alternative was abandoned, there being no evidence to show its immaturity at the time of its birth. In regard to the second, involving the question of protracted gestation, there were several medical gentlemen examined, many of whom were then the most distinguished accoucheurs in London. Of the seventeen that underwent examination, five gave their opinion in favor of a fixed period of pregnancy, although each one fixed upon a period of different length from every other. The other twelve gave their opinion in favor of protracted gestation. Their different opinions are given somewhat at length in 1 *Beck's Elements of Medical Jurisprudence*, 463, *et seq.*

The weight of medical testimony was decidedly in favor of protracted gestation, but the decision was made to turn upon other questions, viz., the concealment of the birth from the husband, and the well established fact of the adultery of the mother.. The son of Lord Gardner by the second marriage obtained the peerage.

Vexed and difficult questions sometimes arise in consequence of a widow marrying a second time, almost immediately after the death of the first husband. She may, in such case, be delivered of a child within ten months from the time of her husband's death, and then the question would arise, to which husband would the infant belong? The Romans endeavored to avoid this question, by forbidding the widow to marry until after the expiration of ten months, and subsequently, until the expiration of twelve months.

As neither the English nor American law has any such provision, a question of that kind arising, must be solved on physiological principles.

In the reign of Richard II., a woman immediately after the death of the first husband, took a second, and had issue born forty weeks and eleven days after the death of the first husband. It was held to be the issue of the second husband.

Another case is stated in *Hargrave's Notes*, and also in *Croke Jac.*, 686: "Thecar marries a lewd woman, but she doth not cohabit with him, and is suspected of incontinency with Duncomb. Thecar dies; Duncomb within three weeks of his death, marries her; and two hundred and eighty-one days and sixteen hours after his death, she is delivered of a son. Here it was agreed,

1. If she had not married Duncomb, without question, the issue should not be a bastard, but should be adjudged the son of Thecar:

2. No averment shall be received that Thecar did not cohabit with his wife:

3. Though it be possible that the son might be begotten after the husband's death, yet being a question of fact, it was tried by a jury, and the son was found to be the issue of Thecar.

The case of *John and Jacob Redlion* vs. *Woolverton*, as quoted in 1 *Beck*, 484, from *Hazard's Register of Pennsylvania*, 7, 363, is an American case of some interest. The plaintiffs were brothers of Christian Redlion, deceased, upon whose death without issue, they were entitled, under the will of Michael Redlion, their father, to a considerable sum of money. Christian, the deceased, was married to Catharine Stout in the spring of 1825, and died on the 5th November of the same year. Catharine, his widow, married Thomas Woolverton, the defendant, on the 16th of March, 1826; and on the 15th of September, 1826, she had a son born, who survived. The question was, who was the father, the first or second husband? The first husband committed suicide, and from his death to the birth of the child was ten months and fourteen days, while from the marriage with the second husband to the birth, was only six months. The cause was decided in favor of the plaintiffs, the child being considered as the issue of the second husband, or at least not as the issue of the first.

It has been suggested that the resemblance of the child to its supposed father, might be a valuable means of determining its paternity. This, however, on examination, will turn out to be a very uncertain source of evidence to be relied upon.

Although, as a general rule, there is little doubt but that features and physical forms, as well as mental and moral characteristics and peculiarities, are transmissable from parents to children; yet they do not always show themselves in the next succeeding generation. Instances are not unfrequent, of the reappearance of both the physical and mental and moral peculiarities of parents, in the second and even the third generation of their successors. In cases of very marked resemblance, that fact should undoubtedly be taken into consideration in determining the question of paternity. But if there were no such resemblance, it should not be considered as equally conclusive testimony on the other side, as the resemblance might be greater to a more remote ancestor, and that either on the side of the father or mother.

It is however stated, that much reliance can be placed upon the fact of color, to prove paternity; that when the appearance of the child evidently proves that its father must have been of a different race from the husband, as when a mulatto is born of a white woman whose husband is also white, that must afford a clear indication of parentage. There is, however, a singular fact in relation to this, related in *Fowler's work on hereditary* *descent*, 34–5. Two white parents in New Jersey had a child bearing unequivocal marks of African race and blood. It had the flat nose, thick lips, curly hair, and dark skin of a mulatto. It came near creating difficulty in the family, until, on visiting a town in France where the family of the wife had resided for several generations, it was found that her great grandfather was an African. Thus, although the peculiarities of that race had disappeared in two or three generations, yet it again reappeared very unexpectedly in this fifth generation.

The case of *The Commissioners of the Almshouse* vs. *Whistelo*, which was tried in New-York in 1808, and will be found reported in 3 *Wheeler's Criminal Cases*, 194, was one not less curious in its facts than in the discussions contained in it.

Lucy Williams, a mulatto woman, was delivered, on the 23d of January, 1807, of a female bastard child, which became a public charge. She charged it upon Alexander Whistelo, a black man. Upon the production of the child, it was found that its color was somewhat dark, but lighter than the generality of mulattoes; and that its hair was straight, and had none of the peculiarities of the negro race.

The woman in this case made oath that the defendant was the father of the child, but she admitted that a white person on one occasion had been in bed with her, and she had connexion with him. Physicians were sworn to the number of fourteen, several of whom stood high in the foremost ranks of the profession. With the single exception of Dr. Mitchell, they were very unanimous in the opinion that by the laws of nature, the defendant could not be the father of the child; and in their judgment, he was not. Dr. Mitchell admitted that it presented an anomaly in its appearance, but was nevertheless inclined to the opinion that the paternity was rightly charged. The whole proceedings on the trial, and especially the examination of Dr. Mitchell, and the summing up the cause by the celebrated Sampson, are in the highest degree amusing, and possessing a lively interest. The mayor, De Witt Clinton, gave the opinion of the court in favor of the defendant, deciding against the express oath of the woman, on the strength of the medical testimony, and the fact that she had sworn to her having connexion with a white man.

VI. DELIVERY.

The last subject included under the first general division or class, embracing the consideration of things growing out of the sexual relations, is Delivery. It becomes necessary to understand this principally with the view, not alone of being able to recognize it on its occurrence, but also of detecting cases of *concealed* and *pretended delivery.*

The first may be undertaken for the purpose of destroying the offspring immediately after birth, or of hiding the shame of the individual by preventing a public exposure.

The motive prompting to the second may be various. It may be done

1. To produce a supposititious heir to an estate,
2. To influence the feelings of a paramour with a view to marriage, or
3. To satisfy the wishes or appease the anger of a husband.

In relation to concealed delivery, the physician in suspected cases, should make enquiries as to the following points.

1. What are the proofs of previous pregnancy? And this enquiry should be conducted particularly in reference to the sensible signs and indications of pregnancy, particularly enlargement of the abdomen, and whether such enlargement was connected with any apparent disease.
2. To the proofs of recent delivery hereafter noticed.
3. To the connection between the supposed period of delivery, and the state or condition of the child found as to its maturity or immaturity.

Pretended delivery usually presents itself,

1. Where the female has never before been pregnant, or
2. Where one or more deliveries have previously occurred, or
3. Where there has been an actual delivery and the female substitutes a living for a dead child.

The first is the most easily detected. There are signs of real delivery which cannot be feigned. "An enlargement of the orifice of the uterus, and a tumefaction of the organs of generation should always be present; and if wanting are conclusive against the fact." 1 *Beck's Med. Juris.*, 213. A case is mentioned by Dr. Male, in which a physician was called to a pretended labor, and a dead child was presented to him, but there was no placenta. On examining he found the os tincæ in its natural state, nearly closed, and the vagina so much contracted as not to admit the hand. It turned out to be a case of deception, the object of which was to appease the wrath of her husband.

Another case is also mentioned by Dr. Beck. 1 *Beck*, 214, in which the physician was enabled to detect the deception from the following named facts:

1. The infant produced instead of being 53 hours old as stated, presented every appearance of being from five to seven days old.
2. The cord had evidently been secured by some one understanding it.
3. The breasts presented no enlargement, nor any marks of the secretion of milk.
4. There were no lineæ albicantia on the abdomen.
5. There was no discharge from the vagina which was contracted and the labia natural.
6. The mouth of the uterus was neither tumefied nor irregular.
7. The uterus itself was light and easily raised, and had the feel of perfect contraction.

The fraud was subsequently confessed.

In regard to the second, the difficulty in determining is somewhat increased, especially if the examination is not made within eight or ten days, while in reference to the third, that can only be decided by physical proofs, unless some persons have been present at the delivery.

The following are the principal questions that arise for discussion under this head.

1. Can a woman be delivered and be, at the time, unconscious of it; and can she remain unconscious after the occurrence of such an event?

2. Can a woman, if alone at the time of the delivery, prevent her child from perishing after the event.

3. What are the signs and indications of recent delivery, and within what time should the examination be made?

4. Are there any, and what diseases, the effects of which may be mistaken for the traces of a recent delivery?

5. Are there any signs or indications by which it may be determined, whether a woman has ever borne a child, although at a period remote from that of the examination?

6. What is the possible number of children that may be produced at one birth?

7. Under what circumstances, and by what means is it morally, legally and medically proper, to induce premature labor?

8. The changes that occur in the fœtal state and the signs of maturity or immaturity of the child.

9. An enquiry into the state necessary to enable a new born infant to inherit, including the question of viability.

10. What are the signs and indications of the life or death of the child before or during delivery?

11. Delivery after the death of the mother and Cæsarian operation.

12. In case of the death of the mother, what are the signs and indications of delivery that may be revealed by dissection?

It will be perceived that here are grouped together a great number of subjects of investigation, nearly all of which may become important in reference to the perpetration of frauds and impositions; in cases of alleged infanticide; and in questions relating to the descent of property. We shall treat them briefly in the order stated.

1. Can a woman be delivered, and be at the time unconscious of it, and can she remain unconscious after the occurrence of the event?

The first part of the question must be answered in the affirmative under peculiar circumstances. These may be

1. The influence of narcotics or ardent spirits. In 1641, the Countess de Saint Geran, was delivered of a boy whilst stupified by narcotics. On awaking in the morning she found herself

bathed in blood and the infant gone. Her relations had done it from interested motives.

2. Its occurrence is also possible, without consciousness, in cases of coma, delirium, and puerperal convulsions. A case is mentioned by Dr. Cheyne, where a female was delivered of a living child during an attack of apoplexy.

3. It has even occurred during sleep, two cases of which are cited by Dr. Montgomery. The one was a case of great respectability, being the wife of a peer of the realm, who was actually delivered in her sleep. The other case is stated on the authority of Dr. Douglass. *Guy's Principles of Forensic Med.*, 120; *Montgomery's Signs of Pregnancy*, 313.

4. It has also occurred during suspended animation, or even after the death of the mother. This is certainly an extraordinary fact, but it rests on high authority. It is attested by Foderè, Buffon, Bichat, and others. *Guy's Med. Juris.*, 120; *Montgomery's Signs of Pregnancy*, 312; 1 *Beck's Med. Juris.*, 228.

Dr. Sloyer of Mulhausen, has given an account of a female dying in labor, who was put on the bier for interment, and while there, an infant was suddenly born. This must be owing to the independent contractile power of the uterus, and shows the continuance of the nervous and muscular, after the cessation, or separation from the organism, of the sensorial power, which latter is what constitutes death.

Thus the possibility of this event is clearly shown, but it must occur under peculiar circumstances, and it may well be doubted whether it can ever occur during a natural sleep to a woman in her first pregnancy, or to any one unless she have borne many children, and have naturally a very easy delivery.

But in relation to the second branch of the question, it is hardly possible, under any of these circumstances, that a woman can be *afterwards* ignorant that she has been delivered. This cannot happen except in cases of mental alienation or disturbance lasting through a considerable period of time. An extraordinary case of this kind is related by Dr. Montgomery, in which the woman lost her power of recollection for the preceding six months, her delivery occurring during that time. *Montgomery's Signs of Pregnancy*, 311 – 12.

2. Can a woman, if alone at the time of the delivery, prevent her child from perishing after the event?

This question has its most important bearing on the subject of infanticide, and is by many medical jurists discussed in connexion with that subject. The answer to it would probably be in the affirmative, if the mother were self-possessed, and had enjoyed her ordinary health and strength, unless under peculiar circumstances. Thus if the delivery be early and very rapid, there may be such a conformation of the pelvis, and so powerful an action of the uterus, that the membranes and fœtus are suddenly expelled together. In such case the child might fall, and its death ensue, if she remained unassisted. So also it is possible that a woman may be taken in labor and delivered while passing her fæces. Instances of this have occurred but rarely if at all in a first pregnancy. The delivery may also be attended with hæmorrhage, fainting or convulsions, and the female be unable to assist her offspring. The child may also have its face to the sacrum, and be delivered with it downwards; in which position it cannot breathe unless it be turned; and a very slight cause suspending respiration at its very commencement, would have the effect to destroy it. The infant from weakness at birth, may perish for want of warming and other applications. 1 *Beck's Med. Juris.*, 229, *et seq.*

It is also obvious that the infant may perish without any default of the mother, when the umbilical cord has not been tied after being cut, broken or torn. In reference to all this, the principle laid down by Dr. Beck (see 1 *Beck*, 232,) is undoubtedly true, viz: "That every woman is more or less acquainted with the time when she is to be in labor, and that it is her duty never to be so far alone as to render assistance accidental."

3. What are the signs and indications of recent delivery, and within what time should the examination be made?

The following are relied upon as the signs and indications of recent delivery:

1. Face paler than usual, eyes depressed, and surrounded by

a slightly brownish circle; the expression of the countenance resembling that of a person recovering from a slight indisposition; the pulse somewhat accelerated; the skin soft, warm, and relaxed, with a moisture having a peculiar and sometimes unpleasant odor.

2. The breasts, if examined the third or fourth day after delivery, will be found full, tense and hard or knotty, and if pressed will yield a lactiform fluid. The nipples appear turgid, and the areola fully developed as hereinbefore described. The first secretion of the breasts has generally a yellow color, is thick, tenacious and ropy, and coagulates by heat, acids and alcohol. *Montgomery's Signs of Pregnancy*, 303.

3. The abdomen is full, its integuments relaxed, or thrown into folds; the skin remarkably moveable on the subjacent muscles. The light colored, broken streaks or cracks are present, called the lineæ albicantia. These are the most numerous from the groins and pubes towards the umbilicus, which is often found projecting and of a conical form. The uterus does not immediately contract and resume its original form, and hence if the hand be pressed over the pubic region, a tumor is felt, produced by the imperfectly contracted uterus, which is about the size of the head of a new born child, and rises three or four inches above the brim of the pelvis, inclining more to one side than the other.

4. The external parts of generation are swollen and sometimes contused or torn, especially after a first or a difficult labor; and they also partake of the relaxed state of the internal parts. The vagina is greatly relaxed and dilated, its internal surface rendered smooth, its natural rugæ being obliterated by the recent distention of its tissues. If examination be made shortly after delivery, the orifice of the os uteri is found in such a patulous state that its margins cannot be distinctly recognized, as they appear to be merely the continuation of the vagina itself.

The state and condition of the uterus and os uteri must be made by an examination per vaginam. The first is found very much enlarged, and its identity with the abdominal tumor is established. The latter is found gaping open so wide in a woman recently delivered, that two or three fingers might be introduced into it with ease. Its margins are flabby and much relaxed, and often feel as if divided by several small fissures.

5. *Laceration of the perineum.* In the case of delivery for the first time, it frequently happens that the fourchette is torn, and sometimes the rent extending backwards divides the perineum to a greater or less extent. This, however, is simply a contingency that may or may not happen according to circumstances.

6. *The lochia.* This is a sanguineous discharge flowing from the ruptured blood vessels in the interior of the uterus. It is not, therefore, like the last, an occasional, but a constant attendant, commencing from the time of delivery, and continuing for a period varying between four or five days to as many weeks. This discharge generally continues red for the first three or four days, then becomes nearly colorless or acquires a brownish or greenish hue, from which it is sometimes called the *green waters*, and after a week or eight days it generally altogether ceases.

This fluid is best known by its peculiar odor, by which it is distinguished from menstruation, leuchorrhœa, or other morbid discharges. It has been spoken of as resembling 'fish oil,' while others call it a sour smell, and the peculiar odor of it, as stated by some, it is impossible to destroy. *Montgomery's Signs of Pregnancy*, 303, *et seq*; *Guy's Med. Juris.*, 117; 1 *Beck's Med. Juris.*, 207–8.

In relation to the time, within which examination should be made, in order that any reliable evidence can be drawn from these signs and indications, it is extremely difficult to fix upon any general rule. Owing to differences in constitution, states of health, and habits of life, there is great diversity observable among women in regard to the time required in recovering from a delivery. While some require scarcely a day, others are enfeebled for weeks. Still as there is a period in all when the parts return to their natural state, and all the indications of recent delivery disappear, and it is extremely desirable to have some rule stated, the term of eight or ten days has been fixed upon by the majority of writers, beyond which an examination can disclose nothing possessing any value as evidence. After that period the signs become so equivocal as, if relied upon, very often to lead to error. 1 *Beck's Med. Juris.*, 209.

4. Are there any, and what, diseases whose effects may be mistaken for the traces of a recent delivery ?

In regard to the first indication mentioned, it must be obvious that many diseases will render the face paler than usual, give acceleration to the pulse, and probably cause the other appearances mentioned to be presented. As to the other signs and indications, it is remarked by Paris and Fonblanque, that "dropsical discharges from the uterus, uterine hœmorrhage, the expulsion of a mole, hydatids, or polypus ; or the removal of any of those diseases which constitute what has been termed a false conception, have been said to occasion effects which simulate the signs of parturition. There are some signs common both to the diseases in question, and to the delivery, but there are at the same time others that exclusively indicate the occurrence of the latter ; the irruption of fluids from the womb, menorrhagia, and leucorrhœa, may mimic the lochial discharge, but they will not remain nor will they present that characteristic odor by which the latter is so pre-eminently distinguished. So again, the relaxation of the soft parts may be the consequence of disease as well as of delivery, while the paleness of the visage is the usual concomitant of profuse evacuation ; but then the distention of the vagina, and the state of the neck of the uterus, and the absence of all contusions, lacerations and discolorations will obviate the possibility of deducing any erroneous conclusion from these phenomena. The wrinkles and marks upon the abdomen may certainly follow any considerable change in the reduction of its bulk, whether it be the result of parturition, ascitic discharges or the absorption of fat ; but we may easily disarm such signs of their treachery by a previous enquiry into the state of the woman's health, and into that of her robustness and general strength. Burns, also remarks, that other circumstances may concur in confirming the opinion of the practitioner, as, for instance, if the patient give an absurd account of the way in which her bulk suddenly left her, ascribing it to a perspiration, which never, in a single night, can carry off the size of the abdomen at the end of a supposed pregnancy. 1 *Paris & Fonblanque's Med. Juris.*, 254–5.

From these remarks will arise the obvious reflection, that no inconsiderable degree of importance must be attached to the concurrence of a great number of the signs and indications of delivery. As Chaussier very well remarks, there is no disease or affection, besides parturition, which can possibly produce the whole series of signs above described. *Montgomery's Signs of Pregnancy*, 305.

It may be proper here to remark that it is not every pregnancy that terminates in a delivery. A woman may be pregnant and the fruit of her womb may be blighted at any period of gestation. Notwithstanding that, it may be retained in utero, until the full time is accomplished, while the size of the abdomen happening, from some other accidental cause, to continue increasing, until the expulsion of the blighted ovum occurs, the woman may be suspected of having brought forth a child. Strange as it may appear, when even the full term of utero-gestation has been accomplished, and the life of the fœtus has been distinctly recognized, it has not been followed by the birth of a child. Dr. Montgomery gives a remarkable case of this kind occurring in his own practice, and also quotes one from Morgagni. *Montgomery's Signs of Pregnancy*, 300–1. Upon the strength of these cases he very properly remarks, that these demonstrate the imperfection of the rule of law concerning concealment of birth, in order to prove which, it is held sufficient to ascertain, that there has been a pregnancy, or a delivery; for in those cases pregnancy was clearly ascertained, the motions of the child were strongly felt, and the full term of gestation was accomplished, and yet no child was born. *Ib.*, 302.

5. Are there any signs or indications by which it may be determined whether a woman has ever borne a child, although at a period remote from that of the examination?

There is, probably, little under this head of enquiry that can be possessed of much real value to the medical jurist. The following indications are chiefly collected from Paris and Fonblanque; but they very properly remark, that *singly*, they can furnish but very slender evidence; and should they even all occur together, they must be regarded as affording only a strong presumption of the fact.

1. The loss of the signs of virginity:

2. The orifice of the uterus has not its usual conic figure; its lips are unequal, and it is more open than in those who have never borne children:

3. There is a roughness of the abdomen, the parietes of which are also more expanded and pensile:

4. There are small, white, and shining lines running on the surface of the abdomen, the linæa albicantia:

5. The frænum of the labia obliterated:

6. The breasts are more flaccid and pendulous, and the lines on their surface are white and splendid:

7. The nipples are prominent, and the color of their discs brown. 1 *Paris & Fonblanque's Med. Juris.*, 256.

6. What is the possible number of children that may be produced at one birth?

Paris and Fonblanque say, that according to the most accurate estimates, *twin cases*, on an average, occur about once in ninety labors; and *triplets* are considered more rare. They are stated not to take place more than once in three thousand times. The occurrence of four at a birth is so rare an event, that no calculation has been formed upon the subject. Dr. Osborne states that he has distinctly traced as many as six fœtuses in an abortion. 1 *Paris & Fonblanque's Med. Juris.*, 259.

7. Under what circumstances, and by what means, is it morally, legally, and medically proper, to induce premature labor?

The means by which premature labor may be effected, belong entirely to the medical profession. In cases where this became necessary, the practitioner would be held responsible for a resort to the best means the profession had it in its power to furnish. The most certain, efficient, and generally resorted to, are mechanical. It is well known, that premature labor may be induced by a mechanical operation.

The most difficult medico-legal question is, to determine under what circumstances it is proper or necessary to bring on prema ture labor. Cases occur of a pelvis so distorted that a full grown fœtus cannot pass through without mutilation, and in which this operation may be performed with perfect safety to the mother, and sometimes to the child also. Dr. Denman relates, that in 1756, there was a consultation of the most eminent men at the time in London, to consider of the moral rectitude, and the advantages which might be expected from this practice, and that it met with their general approbation. 1 *Paris & Fonblanque's Med. Juris.*, 271.

Mr. J. Barlow had recourse to this practice, in cases of distorted pelvis, eighteen times in five women; the result of which was, that all the women recovered, and of the children thus brought into the world, six were dead and twelve born alive, some dying soon after birth, one living ten months, and five were living at the time the account was published. His method consisted in exciting premature labor early in the seventh month of pregnancy *Ibid.*, 272.

Dr. Hull, as quoted by Paris and Fonblanque, doubts the propriety of resorting to this practice in any deformed woman, before the crotchet has been found necessary, and employed in a previous labor. He says, it has happened in a number of instances, that where the perforator and crotchet have been resorted to in the delivery of the first child, the women have subsequently been delivered of one or more living children at the full time.

Dr. Merriman observes, that a regard to his own character should determine the accoucheur not to perform this operation, unless some other respectable practitioner has seen the patient, and has acknowledged that the operation is advisable. 1 *Paris & Fonblanque's Med. Juris.*, 273.

It would seem as if the law ought to interpose no obstacle to resorting to this practice, at any period of gestation, for the purpose of saving the life of the mother; and yet the legislation of this State is of a character to throw a degree of distressing embarrassment upon this question. The statutory provisions at present in force, are to be found in the act passed May 13th, 1845, *Session Laws*, 285; the first section, however, being amended by an act passed at the next session. That first section, as amended, substantially prohibits every person from administering to any woman pregnant *with a quick child*, any medicine, drug, or substance, or from using any instrument or other means, with intent to destroy such child, *unless the same shall have been necessary to preserve the life of the mother;* otherwise, in case of the death of the child or mother, it should be manslaughter in the second degree.

The next section prohibits every person from administering to any pregnant woman, or prescribing for such woman, or advising or procuring any such woman to take any medicine, drug, substance or thing whatever, or from using or employing any instruments or other means whatever, with intent to procure the miscarriage of any such woman; and prescribes the punishment to be, imprisonment in a county jail not less than three months nor more than one year.

It will be perceived that there are at least two marked differences between these two sections. In the first, the woman must be pregnant *with a quick child;* in the second, she may merely be pregnant without having quickened. In the first is contained the exception of its *necessity to preserve the life of the mother;* in the second *there is no such exception.* We are, therefore, reduced to the sad humility of admitting, that by the legislation of this State, in all cases of distorted pelvis, or other anomalies of a kindred character resulting from malformation or disease, the physician, in order himself to escape the consequences of violated law, must delay affording relief to the mother until the period of her quickening, when perhaps it would come too late; and then he may be safe in affording it, if it be necessary to preserve her life. Legislatures are much better versed in the miserable tactics of party, than in the well settled and permanent laws of physiology. What tends, in a peculiar manner, to subject this to animadversion, is, that a section of this act repeals a statutory provision previously existing, in which the same exception was contained in the second section above mentioned as in the first, which of course would entirely remove the objection above made to that section. The act of 1845 was, therefore, not only sinning against light, but knowledge also.

It may be urged, it is true, that the act of the physician being to save the life of the mother, is done with *no criminal intent*, and therefore can no more be considered illegal, than a surgical operation. But the section alluded to, does not, in terms, require a *criminal intent*. It only requires the *intent to procure the miscarriage;* and this intent is certainly that of the physician whose only object is relief to the mother. Besides, if this is an implied exception, why express it in the previous section? Its insertion in one section and omission in the next, ought, in justice to the Legislature, to have some meaning attached to it.

8. The changes that occur in the fœtal state, and the signs of maturity and immaturity of the child.

It is important, in reference to many questions connected with Medical Jurisprudence, that the medical jurist should be enabled to trace the progress of fœtal life, and to understrand the changes it undergoes while in its intra-uterine state. The following brief outline, designed to sketch off the most striking characteristics of that progress, is collected mainly from the works of Drs. Beck and Guy.

It requires some period of time, and, (if the human subject is, in this respect, analogous to some species of the brute creation,) some days must elapse, before the impregnated ovum is conveyed through the fallopian tube into the uterus. It is generally stated to require some twenty days to elapse, before a defined ovum, containing a defined embryo, can be discovered in the uterus. It has undoubtedly been seen earlier, and within twelve days from conception. It has been even said to be visible only eight days after impregnation. In two weeks, the embryo measures one-twelfth of an inch; in three, one-tenth; and in four, three to five lines. At this last mentioned time, it is of the size of a large ant, a barley-corn, or a house fly. Its weight is now about twenty grains. Its form resembles that of a serpent; a swelling indicating the head, while the other extremity is slender and terminates in the umbilical cord. A cleft indicates the mouth, two black points the eyes, the liver occupies the whole abdomen, the bladder is large, while the members begin to appear as nipple-like protuberances.

At six weeks very considerable changes are found to have taken place. Its length varies from seven to ten lines. Its weight from forty to seventy-five grains. The face is now distinct from the cranium. The head appears distinct from the thorax. The apertures of the nose, mouth, eyes and ears are perceptible. The hands, fore-arms and fingers are distinct. Legs and feet are near the anus. The umbilicus is distinct. The placenta begins to be formed. The umbilical vesicle is large. There are even points of ossification in the clavicle and maxillary bone.

At two months another series of changes present. Length about two inches, weight from three to five drachms. We have now the rudiments of the nose and lips. The arms and legs are detached from the trunk. The anus is marked by a dark spot, and the clitoris or penis is apparent. We can discern the rudiments of the lungs, spleen and supra-renal capsules. The placenta begins to assume its regular form; the umbilical vessels are becoming twisted. There are points of ossification in the frontal bone and in the ribs.

At three months, the length varies from two and a half or three to six inches; its weight from one and a half to two and a half ounces. The head has now a considerable volume; the mouth is closed; the fingers separated. The eyes are shut; the eyelids adhere together. The head is longer and heavier than the rest of the body; the umbilical cord is formed; the genitals are distinct, the penis or clitoris relatively very large; the nymphæ are projecting and the labia are thick. The two ventricles of the heart are distinct. The placenta is completely isolated.

At four months, the length is from five to six, seven or eight inches; the weight from five to seven or eight ounces. The external parts are now all developed except the hair and nails. The main characteristics now are, that the skin is rosy and dense; the mouth large and open; genital organs and sex distinct; gall bladder beginning to appear; meconium in duodenum; cœcal valve visible; umbilicus placed near the pubes; points of ossification in the inferior part of the sacrum; the great relative proportion of the fluid of the membranes disappears, and the fœtus nearly fills the cavity of the uterus.

At five months, length from seven to nine inches; weight from five to seven ounces. The volume of the head is yet comparatively great. The brain is pulpy and is destitute of circumvolutions or furrows. Heart and kidneys are voluminous; nails are now distinct; hair begins to appear; skin is without sebaceous covering; the gall bladder is distinct; points of ossification in the pubis and os calcis; the germs of the permanent teeth are perceptible.

At six months, the length is from nine to twelve inches; the weight between one and two pounds. The skin now begins to present the appearance of a fibrous structure, and some traces of fat are found under the integuments. The head now begins to become smaller in comparison with the body. It is still large and soft and the fontanelles expanded. The brain acquires more consistence but is still easily dissolved. The eyelids are still agglutinated. The scrotum is slightly developed in males, and of a bright red color; the testicles are still in the abdomen. In females the vulva is projecting, and the labia separated by the protuberance of the clitoris. The face is of a purplish red; the hair is white or silvery; sebaceous covering beginning to appear; meconium in the upper part of the large intestines; lungs small and compact; liver very large and situated near the umbilicus, and of a dark red color; the gall bladder contains insipid serous fluid; the bladder is hard and pyriform, and has a very small cavity. Points of ossification are in the four divisions of the sternum. The middle point of the body is at the lower end of the sternum.

At seven months, the length is from twelve to fourteen inches, the weight from two to four pounds. The skin is now of a rosy hue, thick and fibrous, and covered with sebaceous matter. The eyelids no longer adhere together. The cerebral mass becomes more consistent, and its surface a little furrowed. The meconium increases in quantity and occupies nearly the whole of the large intestines. The hair on the head is longer and takes a deeper hue. The nails acquire more firmness. Vulvulæ conniventes are beginning to appear. The gall bladder begins to contain bile. Point of ossification is in the astragalus. The middle point of the body is a little below the end of the sternum.

At eight months, the length is from fifteen to seventeen inches, and the weight from four to five pounds. The skin is now paler, has acquired more density, is covered with fine short hairs, and with a sebaceous envelope. The nails are firmer and reach to the extremity of the fingers. The membrana pupillaris disappears. The testicles descend into the internal ring. The lungs are of a reddish color; the liver preserves nearly its former relative size, but is more remote from the navel. The fluid in the gall bladder is of a yellowish color, and has a bitter taste. The point of ossification is in the last vertebra of the sacrum. The middle point of the body is nearer the umbilicus than the sternum.

At nine months, or the full term, the length varies from seventeen to twenty inches, the weight is six and a half pounds. The head is covered with hair frequently an inch in length. The skin is covered with sebaceous matter. The membrana pupillaris is absent. The bones of the cranium touch each other with their membranous margins, the fontanelles becoming smaller. The nails become more solid and are prolonged to the extremity of the fingers. The white and gray substances of the brain are distinct, and the circumvolutions on its surface are more numerous. The cerebellum and the basis of the cerebrum have acquired a remarkable consistence. The lungs are redder and more voluminous; the liver descends to the umbilicus; the testes have passed the inguinal ring, and are frequently found in the scrotum. The head measures longitudinally from four to four and a quarter inches, and between the parietal protuberances from three and an half to four. Point of ossification is in the centre of the cartilage at the lower end of the femur; the os hyoides is not yet ossified; four portions of occipital bone remain distinct; the external auditory meatus is still cartilaginous. The bladder contains urine. The meconium is found at the termination of the large intestine. The digestive apparatus, the heart and the lungs, are in a condition to commence extra-uterine life. The middle of the body is at the navel or a very little below.

The following are the changes that occur in the brain. "At the fourth week the mass corresponding to the head in the embryo is transparent, containing a limpid fluid. At the seventh and eighth weeks the form and disposition of the brain and spinal cord can be distinguished. The dura mater may be also observed adhering to the inner surface of the skull. During the third month, the tubercula quadrigemina, the optic thalami, and corpora striata are developed; and in the eleventh week, the cerebellum and the hemispheres were recognised. At the fourth month, the tuber annulare and the pituitary gland were observed. The corpus callosum, in the sixth month, is only half as long as the hemispheres of the brain. The choroid plexus is formed in the seventh month, and the corpora olivaria do not protrude till between the sixth and seventh, but the corpora pyramidalia are fully formed a month sooner; and in both, the protrusion is owing to the development of cineritious matter. It is not till near the termination of pregnancy, that the cineritious substance is formed in the spine, or even very manifestly in the convolutions of the brain. 1 *Beck's Med. Juris.*, 245; *Guy's Principles of Forensic Medicine*, 126–7.

The relative proportions between the cerebrum and cerebellum become changed as pregnancy advances. At five months, the proportion is as $18\frac{7}{37}$ to 1; at eight months, as $13\frac{6}{35}$ to 1; and at the full time, as $12\frac{2}{3}$ to 1.

The following exhibits the results of Beclard's observations on the fœtal skeleton:

At two months, length of skeleton, four inches and three lines; spine, two inches.

At three months, length of skeleton, six inches; spinal proportion, as two and two-thirds to six.

At four months and a half, length of skeleton, nine inches; spine, four inches.

At six months, length of skeleton, twelve inches; spine, five inches.

At seven and a half months, length of skeleton, fifteen inches; spine, six and one-third inches.

At nine months, length of skeleton, eighteen inches; spinal proportion, as seven and three-fourths to eighteen.

Each vertebra is formed by three principal points of ossification; one anterior, forming the body or solid part of the bone, and two lateral, constituting the apophysaical masses, which, uniting with the former, complete the annular structure. 1 *Beck's Med. Juris.*, 246.

Both the weight and length of the fœtus, at the time of delivery, have been the subjects of many observations. Considerable discussion on these subjects will be found in 1 *Beck's Med. Juris.*, 247, *et seq.*, and *Guy's Principles of Forensic Medicine*, 127, *et seq.* The weight is found to differ considerably, owing, probably to a variety of causes. The weight varies in different nations; or, what is more probable, in the different races of men as identified by ethnography. It varies in the two sexes; and it varies according to the health, habits, and peculiar idiosyncracies of the parents.

In France, the weight is less than in England. The average weight in the former, according to Camus, and also to a great number of observations subsequently made at Paris, is six and one-quarter pounds. From a great number of observations made in England, and from the results of Dr. Joseph Clark's enquiries, it appears that the far greater proportion weigh from five to eight pounds; that the average weight of male children was seven pounds five ounces and seven drachms; and that of female, six pounds eleven ounces and six drachms; and that, taking the average weight of both sexes, twelve males are as heavy as thirteen females.

It is stated as a probable fact, that in this country the average weight exceeds seven pounds. This was the opinion both of Professor Dewees, and also of Professor Willoughby. Instances of much greater weights are on record. Several are given of twelve pounds, twelve and three-quarters, thirteen pounds thirteen ounces, fourteen pounds; two by Dewees, of fifteen pounds; one of sixteen and a half, in New-York. The largest weight, recorded by Billard is twenty-seven pounds. 1 *Beck's Med. Juris.*, 250; *Guy's Principles of Forensic Medicine*, 129.

On the other extreme, in one instance, a child at the age of six weeks, weighed but two and a half pounds, with its clothes on. Two cases have occurred in Brooklyn, (N. Y.,) in one of which, a child born at the full time weighed one pound and nine ounces, and lived five months. The other child weighed, at birth, but one pound, and lived five weeks. The smallest weight among several thousand children recorded by Billard, is two pounds thirteen ounces and four drachms. *Guy's Principles of Forensic Medicine*, 129.

In cases of twins, the united weight is generally greater than where there is a single fœtus, although their individual weight is less. The average weight of twelve twins was eleven pounds the pair, or five and a half each. Among four hundred and forty-four pair weighed in Paris, the average weight was four pounds each, and the extremes were three and eight pounds.

In a case which occurred at Fairfield, (N. Y.,) there were four children born, which all lived a day. Their aggregate weight was eleven pounds fourteen ounces. In Glastonbury, (Ct.,) triplets were born, whose united weights was eighteen pounds. Still-born children are generally heavier than those born alive.

There is about as much variety in the length of a fœtus born at the full time, as in its weight.

Roedere, from his examination, concludes that the average length of a male is twenty inches and a third, and that of a female nineteen inches and seventeen eighteenths. Dr. Dewees once delivered a child that measured 27 inches. Both the weight and length, and general dimensions of the fœtus will be more or less dependent upon the age and vigor of the mother, her mode of life, the diseases to which she may have been subject, and probably the climate in which she lives. 1 *Beck's Med. Juris.*, 253.

In drawing inferences relative to the maturity of the fœtus from its length, a good deal of reliance is placed upon the relative position of the centre of the body. The greater the relative length of the superior over the inferior parts of the body, the younger and more immature the fœtus. The equilibrium between the upper and lower parts generally occurs at the time of birth, at which time the navel will be at the middle of the body or nearly so. *Ib.* 252.

The characters that mark the maturity of the child are the following as quoted from Fodere & Capuron, by Dr. Beck and Dr. Guy. 1 *Beck's Med. Juris.*, 253; *Guy's Principles of Forensic Med.*, 212. The ability to cry as soon as the child reaches the atmospheric air, or shortly thereafter, and also to move its limbs with facility, and more or less strength; the body being of a clear red color; the mouth, nostrils, eyelids, and ears perfectly open; the bones of the cranium possessing some solidity, and the fontanelles not far apart; the hair, eye brows, and nails perfectly developed; the free discharge of the urine and meconium in a few hours after birth; and finally, the power of swallowing and digesting, indicated by its seizing the nipple, or a finger placed in its mouth.

The signs of immaturity are the following:

The length and volume of the infant much less than those of an infant at full term: it does not move its members, and makes only feeble motions; it seems unable to suck, and has to be fed artificially; its skin is of an intense red color, and traversed by numerous bluish vessels; the head is covered with down, and the nails are not formed; the bones of the head are soft, and the fontanelles widely separated; the eyelids, mouth and nostrils are closed; it sleeps continually, and must be preserved by artificial heat; and lastly, it discharges its urine and meconium imperfectly, and often after a long interval.

As additional signs of immaturity, may be mentioned the presence of the membrana pupillaris, the position of the centre of the body already mentioned, the non-descent of the testicles from the abdomen, the large size of the head as compared with the body, the great prominence and deep red color of the parts of generation, and the total absence or scanty deposit of sebaceous matter on the skin. *Guy's Principles of Forensic Medicine*, 212.

9. An enquiry into the state necessary to enable a new born infant to inherit, including the question of viability.

To enable the infant to succeed to property according to the Roman law, it was necessary that it should be perfectly alive. An old French law ordained that it should live an hour, and be able to see the four walls and ceiling of the chamber before it could inherit. It was subsequently altered, directing that it should cry. The present French law simply directs, that in order to succeed it must be born viable, and the word life, or being born alive, is construed to mean complete and perfect respiration.

In England, the question of life or death at birth, and of ability to inherit at birth, arises frequently in those cases where a man claims as *tenant by the curtesy of England.*

This is defined by Blackstone and substantially by Coke, to be "where a man marries a woman, seised of an estate of inheritance, and has by her, issue born alive, which was capable of inheriting her estate. In this case he shall, on the death of his wife, hold the lands for his life, as tenant by the curtesy of England." 2 *Blackstone's Com.*, 127.

This feature has also been adopted into American Jurisprudence, in those States where the English common law has been adopted as the law of the land. It forms a part of the Jurisprudence of this State.

The most important question that has arisen under this, is as to what constitutes being born alive. Some have said it must be heard to cry, but this is a mistake. Crying, indeed, says Blackstone, is the *strongest* evidence of its being born alive; but it is not the *only* evidence. Coke says, "if it be born alive it is sufficient, though it be not heard to cry, for peradventure it may be born dumb. It must be proved that the issue was alive; for mortuus exitus, non est exitus; so the crying is but a proof that the child was born alive, and so is motion, stirring and the like. *Coke's Institutes, lib.* 1, *Chap.* 4, §35–30 *a.* These doctrines are sustained in *Dyer's Reports*, 25, and in *Paine's Case*, reported in 8 *Coke's Reports.*

In the case of *Fish* or *Fisher* vs. *Palmer*, tried in the *Court of Exchequer*, at Westminster Hall, in 1806, the question arose directly whether the infant was still born at birth. The physician who was deceased at the time of the trial, had declared an hour before the birth that the child was alive, and a warm bath having been prepared under his directions, the child, when born, was given to the nurse to be immersed in it. It neither cried, nor moved, nor showed any symptoms of life; but while in the water, there twice appeared a twitching and tremulous motion of the lips. Upon being informed of that, the physician directed the attendants to blow into its throat, but no other signs of life were ever exhibited.

The facts thus presented led to considerable discussion. Two physicians give it as their opinion that the twitching and tremulous motion could not have happened, had the vital principle been quite extinct, and they, therefore, inferred that the child was alive. Dr. Denman thought the child was not alive. He drew a distinction between uterine and extra-uterine life, and attributed the motion to the remains of the former. The jury empanneled to try the case found that the child was born alive.

This decision has elicited considerable discussion. Its correctness has been very properly questioned on sound physiological grounds. These convulsive motions, it has been said, merely show that the muscular fibre has not yet lost its contractility. Even still born infants are sometimes observed to open their mouths, and extend their arms and legs. It has been suggested that it may be merely the relaxation of a contracted muscle, or the stimulus of the atmospheric air on a body unaccustomed to it. 1 *Beck's Med. Juris.*, 260.

The looseness of the law on this subject was very extensively discussed, on an appeal to the Minister of Justice in France, by Chaussier. He dwelt on the insufficiency of the signs relied upon; that the pulsation at the umbilical cord, and the spouting of blood from it when cut, only proved the fluidity of the blood and that some action was left in the vessel. That the evacuation of the meconium should not be deemed a sign of life, nor does he admit the position of Lord Coke, that the deaf and dumb cannot cry, but he asserts that experience and observation show that they do cry when perfectly alive. He insists that the proofs of life in disputed cases should be positive and manifest, such as the high red color and warmth of the skin; a free and full respiration, sharp and continued crying, a motion of the heart and limbs, and these continuing for some time. See 1 *Beck's Medical Juris.*, 261–2.

The Scotch law absolutely requires, that, as a proof that the child was born alive, it shall be heard to cry; and in one case, where the child breathed, raised one eyelid, and expired in the usual convulsions about half an hour after its birth, but was not heard to cry, it was decided that the tenancy by the curtesy was not made out. 1 *Beck's Med. Juris.*, 362.

In a case which occurred at Turin, in 1818, the Cæsarian operation was performed after the death of the mother, the child was still alive, but died at the end of thirteen minutes, and was not opened. The facts evidencing life were, that motion of its legs and feet were discovered during, and after the operation; it opened its hands, which were closed; blood sprung out of the umbilical cord on being cut, and pulsations were felt in the cord, the carotid arteries, and region of the heart; water being poured on its head in administering baptism, a motion of the lips and mouth was perceived, and an impression which produced an inspiration; the natural heat remained; after having lived about thirteen or fourteen minutes, some drops of blood came from its nose, it became pale, stretched its limbs, closed its eyes and died. A commission named by the faculty of Strasburgh, found no difficulty in this case, in finding that the child lived a life which rendered it capable of succeeding; that the operation had rendered it thus capable, and that it had really breathed. 1 *Beck's Med. Juris.*, 263.

A case somewhat involving this question, occurred in this State, in 1830—the case of *Marselis* vs. *Thalhimer*, reported in 2 *Paige*, 35. The question related to the disposition of property, as between the widow and the heirs of the deceased husband. She claimed one-third, under the statute of distribution, and the remainder as heir of her child, which was born two months after the death of the husband, which was full grown but had never breathed. It was claimed that a child *in ventre sa mere* was a life in being, both as regarded its own benefit and that of other persons; and that, upon establishing the fact of birth, the legal presumption was, that it was born alive, until the contrary appeared. The court decided against any legal presumption of life at birth, laying down the doctrine, that the existence of life at birth was a fact which, like any other, should be proved by the party seeking to claim any benefit from it; that the evidence given before the surrogate did not prove that the child was born alive, and that prior to birth, the presumption of life in the child was merely for its own benefit, and contingent upon its subsequent birth alive, and that the rights of others must remain unaffected, no such presumption existing in their favor.

In connexion with this subject, should be briefly considered the question of *viability*, (as the French term it,) that is, the earliest period of gestation after which a child is considered capable of living, or sustaining an independent existence. This means "an aptitude for extra-uterine life, characterized by the maturity of the infant, the good conformation of the principal organs of the economy, and the healthy state of those organs at the epoch of birth." The true question presented in any enquiry of this character, is the earliest period of gestation at which a child has been born, and has survived its birth so long as to prove that there was no physical obstacle to its attaining the adult age. *Guy's Principles of Forensic Medicine*, 209 – 10.

If a child survive its birth a week or ten days, that may fairly be considered as evidencing the fact that it was born viable.

It is universally admitted, that a child may be born at the seventh month of utero-gestation, and live to manhood. It has been supposed by many, that the chance of living is greater at seven than it is at eight months of gestation. But recent experience seems to contradict this. 1 *Beck's Med. Juris.*, 257.

The difficulty, therefore, can only exist in reference to periods of time anterior to six months. It is now considered a safe position to take, that a viable child cannot be born before five calendar months, or one hundred and fifty days after conception. *Guy's Principles of Forensic Medicine*, 210; 1 *Beck's Med. Juris.*, 255.

There are some extraordinary instances, in which it is said children have been born at an earlier period of gestation, and yet been reared. Fortunio Liceti was said to be born at four and a half months, and to have lived to the age of eighty years. Such cases are not perfectly reliable, as a mistake may have been made in the calculations. A very extraordinary case is mentioned by Dr. Rodman, (the particulars of which are given in *Guy*, 213,) in which the mother was delivered of a living male infant, and, as she was confident, at less than nineteen weeks from the time of conception. Neither its weight, nor the length of its body, could be ascertained until it was three weeks old. It was then found to be thirteen inches in length, and weighed one pound and thirteen ounces. At the age of four months, its functions were all regular, and at five was doing well. A case is also related by Dr. Outrepont, of Bamberg, the particulars of which are also to be found in *Dr. Guy*, 215–16, in which, as was pretty clearly ascertained, the child was born at the expiration of twenty-five weeks after conception.

Dr. Francis has given an instance of a male fœtus, born at the twentieth week of gestation, which lived one hour, and weighed one pound six drachms; its length being ten inches. He also gives another case of a fœtus born in the twenty-third week of pregnancy, which survived. The means resorted to for the purpose of rearing children of early birth, makes probably some difference in the numbers who survive.

10. What are the signs and indications of the life or death of the child before or during delivery?

This may become an important enquiry, where the succession to an inheritance is questioned, or where, in a criminal proceeding, the object is to punish for maltreating a pregnant woman, by means of which her offspring is supposed to have died. It is also important, in its bearing upon the subjects of Abortion and Infanticide.

The three great facts from which the life of the fœtus is inferred during pregnancy, are—

1. The good health of the mother:
2. The progressive increase of the abdomen in size:
3. From the motion of the fœtus, either as experienced by

the mother, or ascertained in any of the ways heretofore alluded to. Each and all these may be deceptive, as will be apparent to any one who properly understands the signs and indications of pregnancy.

The evidence of life during delivery is also lacking in the elements of certainty. The proofs enumerated as relied upon for that purpose are,

1. The limpidity of the waters:
2. The regularity of the pains, and their gradual increase in strength:
3. The pulsation of the heart and umbilical cord of the fœtus, or the pulsation at the anterior fontanelle:
4. The swelling, tension, and elasticity of the presenting part.

These, taken all together, are considered as furnishing strong evidence of life during delivery; although separately, they are comparatively of little value. 1 *Beck's Med. Juris.*, 234.

In regard to the indications of the death of the fœtus, reference must be had to the causes that may have produced it, such as the general state of health and condition of the mother; the excesses of which she may have been guilty; the passions to which she may have been subject, and the good or bad influences that may have been brought to bear upon her.

The signs of death during pregnancy are,

1. A want of motion in the child, the uterus feeling as if it contained a dead weight:
2. The navel is less prominent than it should be:
3. The milk recedes, and the breasts become flaccid:
4. The mother feels a sense of lassitude and coldness, accompanied with headache and nausea. 1 *Beck's Med. Juris.*, 235.

These may all prove more or less deceptive, and separately are of little force. The marked presence of them all would be regarded as furnishing a very clear indication. The death of the fœtus sometimes occurs without exciting any general or local disturbance; the health of the mother remaining good, and nothing to excite suspicion except the suspension of the ordinary proofs of progressive pregnancy. Auscultation may here be practiced generally with success by those who have a correct understanding of it. The pulsation of the fœtal heart would clearly settle the question in favor of life, but the absence of any evidence of it would not so clearly indicate death.

When the fœtus is actually dead and long detained in the uterus, putrefaction generally takes place. In such case the membranes loose their vitality, and blackish fetid discharges are present.

The signs during the progress of delivery of the death of the fœtus are,

1. Absence of motion and fetid discharges :
2. An œdematous or emphysematous feel of the presenting part :
3. The skin is soft and easily torn :
4. The bones of the cranium lose their natural connexion and vacillate on one another :
5. The umbilical cord is found without pulsation and sometimes withered and rotten. 1 *Beck's Med. Juris.*, 236 – 7.

The medical jurist should, however, be cautious and not pronounce hastily upon the sufficiency of these proofs. Dr. Blundell conceives that none should be relied upon except the three following :

1. The cuticle coming away from the head in large flakes, desquamating as from dead bodies :
2. The bones of the cranium being detached from each other, and floating, as it were, in the mollified brain :
3. The umbilical cord cold, brown, flaccid, and destitute of pulsation for half an hour or an hour.

These three ought certainly to be regarded as furnishing clear if not conclusive evidence of death, during the progress of delivery.

11. Delivery after the death of the mother and Cæsarian operation.

This is an operation by which a fœtus is extracted from the uterus of the mother through a wound, made for that purpose, in the abdomen. It has generally been supposed to be termed Cæsarian, from the circumstance that to it Julius Cæsar is said to have owed his life. This operation is more generally performed on the eastern continent, particularly in France, than in England or this country. The life of the woman there is not always sacrificed. But it generally is in England and this country 1 *Paris & Fonblanque's Med. Juris.*, 275–6, 7.

Indeed the operation both here and in England, is seldom or never resorted to, unless in case of the death of the mother, or in desperate cases where her death is inevitable. How long after her death the child may survive in utero is an unsettled question. Twenty-four or even forty-eight hours have been mentioned, but the more sensible writers affix to that statement simply a note of admiration! *Ibid*, 280.

The legal effect of the Cæsarian section in England and in this country, when performed, as it most generally is, upon the dead mother, is that it destroys the tenancy by the curtesy. One condition of that is that the issue must be born during the life of the mother, and therefore, says the great commentator, if the mother dies in labor, and the Cæsarian operation is performed, the husband in this case shall not be tenant by the curtesy: Because at the instant of the mother's death, he was clearly not entitled, as having no issue born, but the land descended to the child while he was yet in his mother's womb; and the estate, being once so vested, shall not afterwards be taken from him. Hence, in a reference out of chancery to the justices in the case of one Reppes, of Northumberland, upon whose wife the Cæsarian operation was performed, she having died in labor, they resolved that he should not be tenant by the curtesy, for it ought to begin by the birth of the issue, and be consummated by the death of the wife. 2 *Blackstone's Com.*, 128; 2 *Paige's Rep.*, 35.

In 1 *Beck*, 264, a case is related of a wife who died of a violent illness in the seventh month of gestation. A quarter of an hour after her death an infant was taken from her by the Cæsarian operation. The father claimed to be its heir. The point was, whether the child was alive when it was extracted. The proof was, that after its extraction it was carried into a cold cellar, that it had opened its eyes, and made some slight motions. Zacchias was consulted in the case, and gave it as his opinion that the child was alive when extracted; that the motions observed were mechanical, and the effect of the cold air upon the body. The decision was given in conformity with this opinion.

12. In case of the death of the mother, what are the signs and indications of delivery that may be revealed by dissection?

The appearances presented on dissection will of course vary much according to the period of time intervening between delivery and the post-mortem examination. The attention will of course be directed almost exclusively to the uterus and its appendages. Should the examination take place immediately after delivery, the changes will be great and easily perceptible. The uterus is found resembling a large flattened pouch from nine to twelve inches long, its mouth open, its parieties soft and relaxed, its cavity containing coagulated blood, and its internal surface covered with the remains of the decidua. The marks of the attachment of the placenta are often visible, and are known by exhibiting a dark color, so much so as to resemble gangrene. The vessels of the uterus, especially that part to which the placenta was attached, are very large and numerous. The uterine appendages, the fallopian tubes, round ligaments, and surface of the ovaria are extremely vascular, so much so, that they have a purplish appearance. The spot from which the ovum escaped is more vascular than the rest of the ovarian surface. This state of these appendages continues until the return of the uterus to its unimpregnated state. 1 *Beck's Med. Juris.*, 216; *Guy's Principles of Forensic Medicine*, 119; *Montgomery's Signs of Pregnancy*, 314.

When time has been suffered to elapse after the delivery, and before the examination takes place, changes will be found to have occurred in the uterus proportioned to the length of that time and to the energy with which the organ may have exerted its contractile powers. An examination made within a day or two after a delivery at the full time, will find the uterus about seven or eight inches long and four broad, its internal surface being vascular, and frequently presenting patches of a purplish color. Its substance is from an inch to an inch and an half thick, and of nearly the consistence of muscular fibre.

At the end of a week the uterus has diminished to a length of between five and six inches. After a fortnight it does not exceed five inches in length. Its vascularity is also very much diminished, and the thickness of its parieties reduced about one-third. But this reduction is accompanied by a corresponding increase in density of structure, and the orifices of the vessels are much less distinct, and the color of the muscular substance is paler.

These changes in the uterine system depend not only on the time that has been suffered to elapse after delivery, but also on the period of gestation at which the contents of the uterus have been expelled.

In a delivery occurring, for instance, in the sixth month, the uterus will be found as small two or three days after it takes place, as it would at the end of two or three weeks at the full time.

After the third week no examination of the uterus will be likely to afford much information. It requires about four weeks to elapse before the return of the uterus to its original unimpregnated condition. But any alterations that may be observed to take place in it towards the conclusion of this period, are too liable to have been induced by contingent causes, to allow of our attaching value to them as proofs of delivery. *Montgomery's Signs of Pregnancy*, 315–16. In examining the ovaria the attention will of course be directed to the enquiry, whether a corpus luteum is to be found or not, as the actual finding of one or more of these bodies, is to be regarded as undoubted evidence of a conception having taken place. The discussion relative to these bodies was pretty fully gone into when on the subject of pregnancy.

A valuable summary of many things connected with delivery is thus given by Dr. Montgomery. *Montgomery's Signs of Pregnancy*, 317–18.

1. The signs of delivery are most distinct after the birth of a full grown child, and least so, when the uterine contents have been expelled at an early period of pregnancy.

2. The proofs are more distinct in proportion to the recency of the delivery, and any examination made after the lapse of ten

days from the time of the delivery, is not likely to afford satisfactory information; the most decisive signs, in general, disappearing within a week.

3. The third or fourth day, generally, presents the results of delivery very distinctly, the condition of the breasts being then most remarkable, from the active secretion of milk.

4. A first delivery is more easily detected than subsequent ones.

5. We cannot, safely, rely on any of the signs of delivery viewed separately, but, must consider them collectively, their mutual relation and correspondence with each other, and with the other collateral circumstances of the woman's case and history.

6. The chief points of attention ought to be the state of the uterus, the external parts, and of the breasts.

7. There are certain physical signs which, when present, are sufficient to establish a negative decision; such are, for instance, a perfect hymen, or an imperforated state of the parts.

8. But, on the other hand, a woman may have borne children and no one mark remain, by which the fact of delivery could be proved, after the lapse of even a few weeks.

9. A woman may be delivered while in a state of insensibility, or even during deep natural sleep; so that her child may perish, merely from want of attention, and without any moral delinquency on her part.

10. A woman may be naturally pregnant, and the life of her child ascertained, and yet, child birth may not occur; the child perishing and being decomposed, before the time of delivery.

This brings to a close the first class, including questions arising out of the relations of sex. These questions were properly first considered, not only because many of them lay at the foundation of being, but because the problems involved in very many of them require first to be solved, before we can be adequately prepared to enter upon the topic that will first present itself in the next class, viz: the deeply interesting and important one of Infanticide.

CLASS II.

QUESTIONS ARISING OUT OF INJURIES INFLICTED UPON THE ORGANIZATION.

The questions arising in this class can only be exceeded in the frequency of their occurrence, by their immense magnitude and importance. There is, probably, neither one of the classes, into which I have divided the general subject, that presents questions more interesting in themselves, or to the public, than this, or those which the public are more interested in having thoroughly understood. Among these, it will be proper to select for consideration,

I. INFANTICIDE.

The investigation of the questions included under this head, very naturally succeeds the class of questions we have just been considering. Several of the topics we have already discussed, are clothed with an importance they would not otherwise possess, in consequence, simply, of the bearing they have on the subject of infanticide. The questions which arise here for discussion, will be perhaps the more advantageously considered, under the following heads :

1. The legal provisions in reference to this crime, and the bearing they have upon the points necessary to be investigated and determined :

2. At what period of gestation is the fœtus to be considered as endowed with life?

3. Has a fœtus in utero been destroyed, and what are the proofs of it, as derived—1. From an examination of the reputed mother; and, 2. From an examination of the fœtus? The latter embracing two subjects of inquiry—1. Whether it be a fœtus that is really expelled? and, 2. If so, what is its probable age and cause of expulsion?

4. What are the means by which abortion may be produced?

5. Has the child attained that size and degree of maturity which would enable it to maintain an independent existence?

6. Was the child born alive? and what are the organs or systems of vessels that can furnish proofs relative to this enquiry?

7. What proofs are afforded by the circulating system?

8. What proofs are derived from the respiratory system?

9. What is the value, objections, and method of using the hydrostatic test?

10. What inferences relative to life, are to be deduced from the state of the diaphragm, discharge of the meconium, and state of the bladder?

11. If born alive, how long did the child survive its birth?

12. How long has the child been dead?

13. Is the child really that of the prisoner, the reputed mother? Has she been recently delivered, and how do the signs of delivery correspond as to time with the appearances exhibited by the child?

14. What are the different modes by which the life of the child may have been destroyed?

15. What are the various criminal modes usually resorted to for the purpose of destroying life, and the proofs that evidence them?

16. What are the natural or accidental modes by which the life of the child may have been destroyed?

17. What are the principal points to which the attention should be drawn, and the most approved methods to be pursued in the making of examinations in cases of alleged infanticide?

1. The legal provisions in reference to this crime, and the bearing they have upon the points necessary to be investigated and determined.

It is a subject of deep interest to the student of general history, or to any one desirous of acquainting himself with the elements of human progress, to investigate the history of infanticide, and enquire into the ideas and practices of different nations, ancient and modern, in reference to it. The prevalence of these ideas and practices; their universality among ancient, and generally among savage and barbarous nations; the gradual entertainment of more and more correct ideas, as nations more civilised and of more purely natural and elevated moral feelings have appeared and exerted their influence in the world's history; all point to this as an excellent barometer by which the feelings of men in different nations and ages may be tested, and their progress in reference to correctness of ideas and purity of feelings and principles ascertained.

The limits I have prescribed to myself do not permit me to go into this history, but those who would feel an interest in such an enquiry may profitably refer to the very excellent chapter on Infanticide by *John B. Beck, M. D.*, in 1 *Beck's Med. Juris.*, 271, *et seq.* The same necessity of consulting brevity will compel me to omit all reference to the laws on this subject of ancient and modern nations, confining myself simply to a brief statement of the laws of England and this country.

Blackstone thus states the English law on this subject. "If a woman is quick with child, and, by a potion, or otherwise, killeth it in her womb, or if any one beat her, whereby the child dieth in her body, and she is delivered of a dead child, this, though not murder, was by the ancient law *homicide* or manslaughter. But the modern law doth not look upon this offence in quite so atrocious a light, but merely as a heinous misdemeanor. But if the child be born alive, and afterwards die in consequence of the potion or beating, it will be murder." 1 *Blackstone's Com.*, 129, *and note.*

In 1803 was passed what was called the Ellenborough act, which enacted in substance that any person wilfully and maliciously administering or taking any medicine, drug or substance, or using or causing to be used any instrument with intent to procure the miscarriage of any woman, not being, or not being proved to be quick with child at the time, and all counsellors, aiders and abettors, shall be declared guilty of felony, and be liable to fine, imprisonment, public whipping and transportation for a term not exceeding fourteen years. The same act also provided that if the same thing was done after quickening it should be punished with death. Other acts were subsequently passed, the last of which, viz., 1 *Vict. Cap.*, 85, enacted that whosoever with intent to procure the miscarriage of any woman, shall unlawfully administer to her or cause to be taken by her, any poison or other noxious thing, or shall unlawfully use any instrument, or other means whatsoever, with the like intent, shall be guilty of felony, and being convicted thereof shall be liable, at the discretion of the court, to be transported beyond the seas, for the term of his or her natural life, or for any term not less than fifteen years, or to be imprisoned for any term not exceeding three years.

It will be observed that by the provisions of this statute, the absurd distinction between women quick and not quick with child is not retained.

The legislation of New-York, in reference to the causing or procuring abortion, is embraced in three sections, one of which provides substantially that the wilful administration to any pregnant woman of any medicine or substance, or the employment of any instrument or other means with intent to procure miscarriage, shall be punished by imprisonment in a county jail, not less than three months nor more than one year. *Session Laws of* 1845, 286, § 2. In this provision it will be perceived the distinction of *quick* or *not quick* is omitted.

Another provision embracing the case of a *woman quick with child*, and providing in the same terms against the administration of any medicine or substance, or the employment of any instrument or other means, with intent *to destroy the child*, and containing the exception of the necessity of the prescription or operation to preserve the life of the mother, and provides, that in case of the death of the child, or of the mother, it shall be deemed manslaughter in the second degree, *Session Laws of* 1845, 28, § 1; the punishment for which is imprisonment in the state prison not less than four nor more than seven years.

An additional section still provides that the wilful killing of an unborn quick child, by any injury to its mother, which would be murder if it resulted in her death, shall be manslaughter in the first degree, the punishment of which is imprisonment in the state prison for not less than seven years.

These are the statute provisions of this state on the subject of abortion. The case of *The People vs. Jackson*, 3 *Hill*, 92, decides that under an indictment for producing an abortion of a quick child which is felony, the prisoner may be convicted though it turn out that the child was not quick, and the offence, therefore, a mere misdemeanor, as stated in the statutory provision first mentioned.

The laws of Connecticut provide that the administering any noxious or destructive substance to procure the miscarriage of a woman quick with child, shall be punished by imprisonment in the state prison during life, or for such other term as the court shall determine. *Revised Laws of Connecticut*, 152.

The legal provision in Ohio, makes the same distinction in relation to the mother's being quick with child or not as the laws of New-York, and there is also the same exception contained in them, but the punishment inflicted is less severe.

The laws against the murder of the new born infant are much more severe. In almost all civilized countries they inflict capital punishment. In England an act was passed in the reign of James I. rendering the drowning or secret burying of an infant, which if born alive would have been a bastard, prima facie evidence of murder, and subjecting the mother to the penalty of death, unless she could prove that the child was born dead. This cruel law was modified in 1803 by the passage of an act declaring that women tried for the murder of bastard children should be tried by the same rules of evidence and presumption as are allowed to take place in other trials of murder. Annexing, however, a penalty, or authorising the court to inflict one, in case of acquittal, upon the mother who was proved secretly to have buried, or otherwise endeavored to conceal, the birth of her child; which penalty was the committing to gaol or the house of correction for any time not exceeding two years.

In most or all the states of the Union trials for destroying the life of the new born infant are subject to the same rules and conducted on the same principles as trials for murder, and if found guilty the offender is subjected to the same penalty. The law upon broad general principles recognizes no difference between destroying a life that is capable of sustaining an independent being, however early it may be in its career of existence, and taking away the same life at any subsequent period. All the attending circumstances, therefore, such as concealment of birth, secretly drowning or burying the body, would be so many facts going to show the criminal intent of the party; but such facts would not alone prove such intent, as they may be accounted for upon other reasons.

Irrespective of the effect which the concealment of the birth or death of a bastard child has upon a trial for infanticide, such concealment itself has been made either a felony or a misdemeanor, and variously punished, in most of the states of the Union. The states of New-York, Massachusetts, Vermont, Connecticut, New-Jersey, New-Hampshire, Georgia, Illinois and Michigan all have enactments on this subject, the punishment prescribed being generally fine and imprisonment.

In this state the endeavor privately to conceal the death of a bastard child is a misdemeanor, and is punishable by imprisonment in a county jail, not exceeding one year. *Laws of* 1845, 286, § 4. A second conviction of the same offence subjects to imprisonment in a state prison for a term not less than two, or more than five years. *Ibid*, § 5.

It will be readily perceived that the great distinction made by the law between the being *quick* and *not quick* with child, renders it a point of primary importance to determine what quickening is, and what shall be the evidence of it. The guilt or innocence of the physician in his attempt to save the life of the mother is made to depend upon it.

So also, whether the same act be manslaughter in the second degree, or a mere misdemeanor, is dependent upon the fact of pregnancy *with a quick child*, or pregnancy without it.

This precise question arose and was discussed in the case, *Rex* vs. *Philips*, 3 *Campb. R.* 74. The medical witnesses examined on that trial, differed as to the time when the fœtus may be stated to be quick, and to have a distinct existence; but they agreed that in common understanding, a woman is not considered to be quick with child till she has herself felt the child alive and quick within her, which happens with different women in different periods of pregnancy, although most usually about the sixteenth or eighteenth week after conception. *Lawrence J*, held in that case, that a woman could not be considered quick with child, until *she had felt the child alive and quick within her.*

This construction put upon the words of the statute, probably explains them in the sense in which the legislature used them, it being undoubtedly designed to fix upon that period of gestation, when the clearest evidences of fœtal life were furnished. It is certainly, unfortunate, that the law has created a distinction, which all sound physiology repudiates, and that it has fixed upon a fact, in relation to which the female herself may be mistaken, a fact that in some instances never occurs during the whole period of pregnancy, and one in which the cause of its occurrence is still a matter of dispute, doubt and difficulty among the medical profession; many, of whom, allege that it depends upon changes in the position of the womb, and that it has no necessary connexion with the child's movements. It is presumed, however, that the existence of life in the fœtus being the great object of enquiry, the testimony of those who actually witnessed the fœtal movements, would be received in evidence of the fact of life, equally as well as the sensations of the mother.

2. At what period of gestation is the fœtus to be considered as endowed with life ?

This, as a legal question, will be answered by the period of quickening. This the law has fixed upon, because the fœtal movements which impart to the mother the sensation of quickening, are the first clearly marked and well defined evidences of life. Physiology, however, returns a different answer. It considers quickening as a mere adventitious event. It looks upon life as entirely consistent with the most profound fœtal repose and consequent inaction. It asks what is the state of the fœtus prior to the period of quickening. Is it alive or dead ?

If alive, then it does not become *first* endowed with life at that period. If dead, where are the evidences of it; putrefaction and decomposition, which are always the inevitable consequences of the extinction of the vital principle. It urges home the well settled fact, that fœtuses do actually die in utero prior to quickening, and that when such an event happens, all the signs of death are present.

In the present state of the law, it is unnecessary to discuss this as a question of physiology, and accordingly we shall not discuss it. It may be affirmed, however, that upon sound physiological principles, the embryo possesses vitality from the very moment of conception.

3. Has a fœtus in utero been destroyed, and what are the proofs of it as derived. 1. From an examination of the reputed mother; and 2. From an examination of the fœtus? The latter embracing two subjects of enquiry. 1. Whether it be a fœtus that is really expelled; and 2. If so, what is its probable age and cause of expulsion?

The above embraces many distinct points of enquiry all grouped together, because they are all intimately connected with each other. With the single exception, however, of the cause of expulsion, which is involved in the next subject of enquiry, these have all been made, and the questions discussed in the consideration of the general subjects of Pregnancy and Delivery.

It will be, therefore, entirely unnecessary to pass them again under consideration, and we shall accordingly proceed to the next subject of enquiry.

4. What are the means by which abortion may be produced?

These may be either *natural* or *artificial*, the latter of which can only be criminal; and hence it will devolve on the medical jurist, the necessity of ascertaining whether the miscarriage is owing to the operation of causes purely natural, or has been effected by artificial, and therefore, criminal means.

The natural causes are either *predisposing* or *exciting*, the one having a *remote*, the other an *immediate* effect. The first may affect either the *female* or the *ovum*. The females most liable are those of a plethoric, irritable, nervous habit or temperament. Excessive, or irregular menstruation and leucorrhœa, or attacks of syphilis, scurvy, asthma, dropsy, or any malignant disease, may become predisposing causes. So also malformations of the pelvis, tight lacing, all diseases of the uterus and its appendages. Rigidity of the uterus, as in those becoming for the first time pregnant at an advanced age, and relaxed condition of the cervix uteri may lead to it. Immoderate venereal indulgence, by enfeebling the uterine organs may also predispose, and a habit of miscarriage is a very common and very powerful predisposing cause. One miscarried twenty-three times at the third month. Another related by Heberden, see *Guy*, 136, miscarried thirty-five times.

The cause of the difficulty is frequently in the ovum. Disease may exist in any part of it, in the membranes, placenta, fœtus itself. Velpau states, that of upwards of 200 embryos expelled before the third month, at least one-half were diseased. It may be important, therefore, to examine what is expelled, and if any distinct traces of disease are observable, a strong probability, in the absence of all contrary proofs, will arise that the miscarriage is owing to natural causes.

The *exciting* or *immediate* causes of miscarriage are also very numerous. Among them are enumerated all strong and sudden actions of the muscles of the abdomen, in efforts of expiration, as coughing, straining, violent exercise as dancing ; profuse discharges from the bowels, or from the uterus itself; blows, and all the various forms of mechanical injury.

The effect produced by these exciting causes, will almost altogether depend upon whether there is any predisposing cause in the case. In the absence of all predisposing causes, and when the female and ovum are in a healthy and sound state, exciting causes alone are rarely sufficient to produce a miscarriage. In appreciating their effect, therefore, reference should be had to the presence or absence of any predisposing cause, and, if present, that circumstance should have great weight in influencing the conclusion arrived at.

The intentional and criminal means of causing miscarriage, with the view of destroying the fœtus in utero are of two kinds, viz : *General* and *local* ; the one acting through the maternal constitution, the other by direct application to the abdomen or uterus.

Among the constitutional means may be enumerated,

1. *Venesection.* This has come down from antiquity, and has high authority to sustain it. The popular belief attributes to it

a great degree of force. This, however, is a popular fallacy. Instances are not wanting where venesection during pregnancy has been resorted to 48, 80 and even 87 different times, without at all interrupting the progress of pregnancy, or preventing delivery at the full time. Dr. Rush states the case of one woman whom he bled 11 times in 7 days during her pregnancy; of another who was bled 13 times, and of a third who was bled 16 times, while in the same condition, and yet they all recovered, and were delivered of living and healthy children.

It may, however, be very true that there are states and conditions of the system when blood letting may prove injurious to the fœtus. In a full state, or an irritable habit of body, or where there is great debility produced by disease, it may very possibly be fatal to the fœtus.

It cannot, however, be possessed of any real value as an abortive agent, and the general impression, that it is more effectual if taken from the foot, is a sheer popular fallacy. Nor, under ordinary circumstances, does any bad effect result from the application of leeches to the anus, inside of the thighs, or the vulva. 1 *Beck's Med. Juris.*, 312–13; *Guy's Principles of Forensic Medicine*, 137.

2. *Emetics.* The agency of emetics in producing a miscarriage, is both affirmed and denied by respectable authorities. The nausea and vomiting that very generally accompany pregnancy, are attended with no bad result in their effect upon the fœtus. The vomiting thus caused is, perhaps, less severe than that which is induced by emetics; besides, it the most usually occurs during the first period of pregnancy, when its effect is very trifling. The spasmodic contraction of the diaphragm and abdominal muscles which occur during the act of vomiting, if very severe and long continued, may no doubt endanger the safety of the fœtus, and sometimes expel it.

3. *Cathartics.* The effect to be attributed to these, in their action on the contents of the uterus, will no doubt be found to depend much upon the state and condition of the woman at the time of their administration, and also upon the nature and energetic qualities of the purgative given. If the female be of a

nervous, irritable habit, or if the purging should be carried too far, or continued too long, or if the article used be very drastic in its nature, or if it be of a character to act particularly on the rectum, there may be danger of its proving fatal to the fœtus. Purgatives of a different character, administered under other circumstances, and in other and different states of the female system, would probably have little if any effect upon the fœtus.

4. *Diuretics.* This class of agents has been enumerated among abortives, but there seems no good reason for ascribing to them any such effect. *Nitre* has, in one instance, when taken in a very large dose, produced abortion. So, also, *Cantharides* have, not unfrequently, been administered for that purpose; but they often, and perhaps the most frequently, fail in producing any such effect.

5. *Emmenagogues.* Under this term are included those substances that are supposed to exert a specific action upon the uterine system. It is no doubt true, however, that many of these fail in producing that effect. Pennyroyal and Polygala seneka are included, and have been made use of as abortive agents, but no very certain effect of this seems to be attributable to either of them. They do not therefore require any particular notice. *Mercury* is included in this class, and formerly, it was regarded as an abortive agent, in its crude state. It was soon ascertained that large quantities of this substance might be taken by pregnant women with impunity. Calomel is the preparation supposed to exert a specific influence upon the uterine organs. As calomel is a medicine of frequent use in medical practice, it would be strange if occasions did not often present themselves, where its employment would be deemed necessary during the state of pregnancy. This has occurred so freqently, and its effect has been so harmless in reference to the fœtus, that but little force is now attributed to it as an abortive agent.

The *Juniperus sabina*, *savine*, is an article that has higher claims than any yet mentioned, as an abortive agent. It has been ranked as an abortive, from the time of Galen. In some cases, it exerts that quality; in others, not. In a case which occurred in New-York, sixty drops of the oil of savine were taken every morning for a week, for the purpose of procuring abortion, in the sixth month of pregnancy. The symptoms induced were, a violent pain in the abdomen and region of the uterus. A still-born fœtus was expelled, which was followed the third day after, by the death of the female. On dissection, the uterine organs, as also the pelvic viscera generally, were found in a high state of inflammation. To this, and its constitutional effects, the miscarriage was in this instance attributed, and not to any specific influence over the uterus. In another case violent vomiting occurred, and, after some days excruciating pains, which were followed by abortion, dreadful hæmorrhage from the uterus, and death. As this is a well known popular agent for the procuring of miscarriage, its use is quite frequently resorted to, and many deaths result from its improper administration. It is not, however, by any means, certain of producing the effect attributed to it. In a case related by Foderè, a girl in the seventh month of pregnancy, took a glass of wine in which was mixed a large dose of powdered savine. On taking the drug, she felt a burning heat, accompanied with hiccough and vomiting. This was followed by a violent fever, which continued fifteen days. She recovered, and at the end of two months was delivered of a healthy child.

Secale cornutum, (*spurred rye*, *ergot*,) is a medicine possessing the remakable property of exciting the muscular fibres of the uterus to contract upon its contents. It was first brought into notice in this country in 1807, and very soon acquired a high reputation for accelerating the process of parturition. It was soon observed that in many cases where it was employed, the children did not respire until an unusual time after the birth, and in some cases, they were irrecoverably lost. Its high reputation in producing abortion soon became very generally established. It was alleged by some, that the power of the ergot was limited to the period of delivery, and that the uterus must acquire its full development and expansion, before it could operate to produce the uterine contractions. From experiments made upon animals, and from other facts that have been collected, it is rendered very evident that it possesses the power of causing abortion at any period. One case is cited, where it was produced at the fourth month of pregnancy, by administering twelve grains of the ergot. There are, however, many instances on record, in which considerable doses of the ergot, often repeated, have failed in producing the desired effect. Dr. Condie states, that he knows of instances where it was employed to the extent of several drachms a day, without exerting the least effect upon the uterus. In all these cases, gestation continued to the full period, and the females were delivered of living children. He states also some cases where pains actually ceased under its use, and labor did not occur until several weeks afterwards.

Upon the strength of these and other facts and reasonings, much difference of opinion now exists in reference to the abortive powers of this agent. The general opinion, however, seems to be, that although it occasionally fails, yet that it more frequently produces its abortive effect.

There are two or three other agents enumerated as possessing abortive powers, such as Actæa racemosa, Digitalis, &c.; but they are of so doubtful a character in this respect, that it will be unnecessary to dwell upon them.

The *local* or *mechanical means*, consist either of *external violence applied to the abdomen or loins*, or of *instruments introduced into the uterus.*

In regard to the first mentioned, it is undoubtedly true, that wounds or injuries of a severe character, when applied either to the abdomen or loins, may produce a miscarriage. It is equally true, that unless there exists the predisposition, they will not be likely to produce this effect, unless they are of a character so severe as to endanger the life of the mother. Where this result is effected by blows upon the abdomen, a considerable hæmorrhage precedes the death of the fœtus. The records of criminal jurisprudence are not deficient in cases where the death of the mother has been shown to have been caused by resorting to these violent means to procure abortion.

In 1811, a man was executed for the murder of his wife. She was pregnant, and he had attempted to induce abortion by elbowing her in bed, rolling over her, &c., in which he succeeded not only in procuring abortion, but along with it, also, the death of the unfortunate woman.

In another case, a female in the last month of her pregnancy, was struck on the abdomen by her husband. An extensive detachment of the placenta caused the immediate death of the fœtus, and that of the mother also, in fifty-one hours afterwards.

In criminal investigations of this kind, one point to be proved is knowledge on the part of the accused, of the fact of pregnancy. It will also be proper to enquire and ascertain whether the injury was of so severe a character as to entitle it to be considered the sole cause of the fatal result; and also whether there was not a predisposition existing, or some precautions omitted, or imprudence practiced, that might have aided in bringing about the result. 1 *Beck's Med. Juris.*, 322.

Instances have not unfrequently occurred, where females have jumped from a considerable height, ran up and down stairs with great rapidity, struck themselves over the abdomen, and rolled themselves over the floor till exhausted, for the purpose of procuring abortion, and all without success; showing very clearly, that unless the predisposition exist, it is a very difficult matter to procure it by these means. *Guy's Principles of Forensic Medicine*, 142–3.

The other local and violent means consist in *the introduction into the uterus, of an instrument for the purpose of rupturing the membranes, and thus bringing on premature action of the womb.*

In some cases where this villainous practice has been resorted to, abortion has been produced by means of it, while in others the child has been born alive; and in all of them, the mother's life has been either sacrificed or greatly endangered. The object has generally been to rupture the membranes, and thereby induce a premature action of the uterus, by means of which its contents would be expelled. This is of more difficult accomplishment, the earlier the period of gestation at which it is undetaken. It is in such cases that the uterus has generally been seriously, and often fatally injured.

Dr. William Hunter undertook to puncture the membranes in a young woman in the third month of her pregnancy, but unfortunately injured the neck of the uterus so much as to destroy the life of the mother. 1 *Beck's Med. Juris.*, 325; *Guy's Principles of Forensic Medicine*, 143.

A case occurred in New-York, in which a silver catheter was introduced, by which the os tincæ was wounded, and the membranes ruptured, but without the expulsion of the fœtus. In fifteen days afterwards, she had violent pains, which ceased on the expulsion of a fœtus of four months, which was hastened by the administration of ergot.

A case occurred in Vermont a few years since, of one Norman Cleaveland, who, for the purpose of procuring abortion, introduced a sharp-pointed instrument into the vagina, which caused the immediate death of the woman. A post-mortem examination disclosed six places in which the neck of the uterus had been punctured, each puncture being from half an inch to three-fourths of an inch wide, and appearing to have been made by a two-edged instrument, like a lancet. The iliac vein was also wounded, and the abdomen filled with coagulated blood. The prisoner was convicted and sentenced to be hung, but the sentence was afterwards commuted to five years imprisonment in the states prison. *Guy's Principles of Forensic Medicine*, 143.

Occasionally all or nearly all the means now enumerated have been employed without producing the desired result. The following case is related by Dr. Wagner, of Berlin. A young woman at seven months had employed savine and other drugs to procure a miscarriage. She next had a strong leather strap, (the thong of a skate,) tightly bound round her body. The paramour then knelt upon her, and compressed the abdomen with all his strength. He next trampled on her person while she lay on her back. As all these failed to produce the effect desired, he took a sharp pointed pair of scissors, and proceeded to perforate the uterus through the vagina. Much pain and hæmorrhage ensued but did not last long. The woman's health continued unimpaired, and about the regular time she produced a living child without having upon it any marks of external injury. *Ibid.*, 143–4.

In one extraordinary case sulphuric acid was injected into the vagina to cause a miscarriage. The most violent inflammation of the parts immediately occurred, accompanied with adhesion of the os tincæ, and the formation of a dense membrane over it. The delivery was first attempted by incisions made into the neck of the uterus ; afterwards the Cæsarian operation was performed, but the mother and child both died. 1 *Beck's Med. Juris.*, 325–6 : *Guy's Principles of Forensic Medicine*, 144.

The practice of producing abortion has long since been reduced to a system, and thus carried on in New-York. Some trials that have taken place there within a few years, disclosed that the usual method resorted to for this purpose, is the introduction of a sharp pointed instrument within the os uteri, and by this means puncturing the membranes. Two or more females there have been extensively engaged in the business, and who have employed physicians to perform the operation, whose names and persons are kept concealed from the patient, thus avoiding all chance of detection. From the disclosures made on the trials no doubt remains, but that the life of the unfortunate woman has been frequently sacrificed, yet the perpetrators of these villainous practices have hitherto escaped the merited punishment. *Guy's Principles of Forensic Med.*, 144, *and note.*

From the results of experience thus far, it seems quite well settled, that there is no one certain medicine that can be administered, or even means that can be resorted to, that is certain and infallible in all cases in the procuring of abortion ; that the most certain of medicines is probably the ergot, and the most infallible means, the introduction of sharp pointed instruments into the vagina and the rupturing the membranes ; that those which are the most certain of either, are also the most sure to injuriously affect, or more generally to destroy, the life both of the fœtus and the mother ; that it is no uncommon thing for both to fall a sacrifice, and that sometimes the mother dies while the fœtus is preserved. Nothing short of doing great violence to the maternal system, either by the administering of substances that are poisons, or the resort to such acts of violence as are of a character in all likelihood to prove fatal, can ever be expected to reach, destroy, and expel the fœtus, without producing the death of the mother, unless a strong predisposition to abortion exists. What renders this practice more cruel, uncertain and hazardous, is, that the great majority of cases in which it is resorted to, are those who are the victims of seduction, where pregnancy has occurred for the first time, where it is unknown whether any predisposition exists or not, and where the woman is ignorant and confiding in her sacrifice of life. It should, therefore, be constantly borne in mind, that there is here a high and stern morality, that should stimulate the medical profession to the exercise of their utmost effort and ingenuity, with the view to master and disclose the secrets of these villainous practices, the more villainous, because they are very generally conceived in fraud, practised in deception upon innocent and unsuspecting victims, and result the most commonly in the destruction of two lives at once.

The following is a brief summary of the principal points to be attended to in cases of abortion.

1. The substance expelled from the uterus, the supposed product of conception, must be examined with the view to determine whether any rudiments of the fœtus can be discovered in it, and if it be a fœtus, to ascertain its age and state of advancement in maturity.

2. There must be an examination of the reputed mother, whether she be alive or dead. In this examination two points are to be kept in view:

1. The means and agencies, whether constitutional or local, or both, that have been resorted to, for the purpose of procuring the miscarriage:

2. Whether any predisposition to abortion exists, and if so, how much of the result is attributable to that, and how much to the means and agencies made use of. With a view to the former, the general state of health of the mother must be enquired into, and whether she has had previous abortions, and if so, whether they occurred at or about the same period of gestation. In case of the death of the female from the means employed, the state of the uterus and other organs must be examined.

5. Has the child attained that size and degree of maturity which would enable it to maintain an independent existence ?

All the essential elements that compose this problem have already been under our consideration. Under the head of delivery will be found a discussion in regard to the maturity or immaturity of the child at birth. It is unnecessary to repeat here what has already been stated. The data from which our conclusions are derived in reference to the solution of this problem, are the length and weight of the fœtus ; the relative position of the centre of its body ; the proportional development of its several parts as compared with each other, especially the head as compared with the rest of the body ; the greater or less degree of growth of the hair and nails ; the condition of the skin ; the presence or absence of the membrana pupillaris ; and in the male the descent or non-descent of the testicles. Dr. Beck and other medical jurists are clearly of the opinion that in a medico-legal point of view, no child ought to be considered as capable of sustaining an independent existence until the seventh month has been fully completed. Accordingly they maintain that if it can be proved that the child which is the subject of investigation, has not attained this age, no charge of infanticide ought to be entertained. 1 *Beck*, 332.

6. Was the child born alive ? and what are the organs or systems of vessels that can furnish proofs relative to this enquiry ?

1. What is the meaning of the term *born alive ?* The conditions of live birth are not satisfied when a part only of the child is born. The whole body must be brought into the world, and after this event the child must be alive. *Rex vs. Poulton*, 5 *Carr. & Payne*, 329 ; 7 *C. & P.*, 814. The circulating system must also be changed, and it must have an independent circulation. *Rex vs. Enoch*, 5 *C. & P.*, 539 ; *Rex vs. Wright*, 9 *C. & P.*, 154. It is not, however, necessary that there should have been a separation of the umbilical cord. The cord may still connect the child with its mother, and yet the killing of it will constitute murder. *Rex vs. Crutchley*, 7 *C. & P.*, 814 ; *Rex vs. Reeves*, 9 *C. & P.*, 25.

We may hereafter enter more particularly into the discussion of what constitutes *life* and *death.* It is only necessary here to say with Dr. Beck, 1 *Beck*, 332, "that we judge of life only from its effects, and declare that being as enjoying it, who performs the functions considered essential to it." These functions are termed vital, and, in discussing the subject of infanticide, may be considered as four in number, viz., the *cerebral*, *sanguineous*, *respiratory* and *digestive.* Each one of these is performed through the medium of a distinct organ or system of organs. The cerebral is performed through the medium of the brain, spinal marrow, and various systems of nerves; the sanguineous, through the heart and blood vessels; the respiratory, through the lungs; and the digestive, through the entire alimentary tube. The mutual and reciprocal action of all these, however, define a being in the full possession of all his powers of life, and have no application to that life which is fœtal and intra-uterine. This life is marked with its peculiarities, among which the most striking are that both the cerebral and respiratory functions are found to be dormant, the respiratory having no existence whatever, and the nervous no other than what is necessary to fœtal growth and development. As the fact of birth stamps no peculiar changes upon either the cerebral or digestive systems, we are to look to other sources for indications of the new kind of life upon which the fœtus then enters. These are found in the circulating and respiratory systems.

7. What proofs are afforded by the circulating system?

The sources of proof here are,

1. The character of the blood. Bichat announces as the result of many experiments made by him, and the dissection of many human fœtuses, that there is really no difference in appearance between the arterial and venous blood of the fœtus; that the blood taken from the aorta and the vena cava, or from the carotid artery and jugular vein, is in all respects the same, without the slightest degree of apparent variation. In this he is also confirmed by Velpau and Autenreith.

Others deny the truth of this position, and affirm that there is a difference in appearance between the arterial and venous blood. The experiments, however, by which they propose to test this, or those related by Dr. Jeffrey and suggested by Mr. Carr, do not appear to be conclusive upon the question, unless they are performed upon a still-born child. The examinations they propose are of the umbilical cord after birth, when, if the child were born alive, we should of course find the same kind of change which respiration constantly produces in the blood of the adult. As there is no power in the fœtal lungs, or provision in the fœtal system, if we disconnect it from the placenta, to change the character of the blood from venous to arterial, it would seem from authority as well as reason, that no perceptible difference should be found to exist between that contained in its arterial and venous systems.

As fœtal blood is destitute of fibrous matter, the coagula formed by it is much less firm and solid than that which results from adult blood.

There is also generally supposed to be a difference between the appearances presented by each on exposure to the action of the atmosphere. Fœtal blood when coagulated presents a brown red, and, on exposure to the atmosphere, does not become florid, like blood from the adult. There are observed running over the brown mass filaments of a red color, which give it a veined appearance. This also has been controverted, but upon doubtful experiments. 1 *Beck's Med. Juris.*, 334.

There is also, according to Fourcroy, a difference in the chemical composition of fœtal and adult blood. In the former the coloring matter is darker, and the blood is not so susceptible of taking the brilliant red shade, on exposure to the atmosphere. The former also contains no fibrous matter. Its coagula more resemble gelatinous matter. It does not contain phosphoric acid. Its proportion of serum is much larger than is to be found in adult blood. It has also been observed that the red globules of fœtal blood are much smaller than those of the adult. 1 *Beck's Med. Juris.*, 335.

2. Another thing to be regarded is the condition of the heart and blood vessels. The fœtal circulation has many very interesting peculiarities. The great object to be attained, and the motive that governs in all its arrangements, is to avoid the double cir-

culation, or that which takes place through the lungs, after the establishment of respiration, and yet by means of mechanism peculiarly adapted to its purpose, to ensure the circulation through every part and texture of the fœtal system. To accomplish this the arrangements are as simple in design, as they are complete in their performance.

The right and left auricle are brought into direct communication with each other by means of a septum or partition, about the size of the mouth of the inferior cava, called the *foramen ovale.* Through this the blood, poured into the right auricle from the ascending cava, passes directly into the left auricle, its return being prevented by the closure of a thin transparent falciform valve, situated on the side of the left auricle. This, therefore, is always found open in the fœtal state, but after the establishment of respiration it gradually closes. Its closure is clear evidence of life and respiration at birth, but its being open is not clear evidence of the contrary. Its successive changes in closing will be considered under another head.

Another peculiarity is the *ductus arteriosus.* This passes directly from the pulmonary artery, entering the aorta just below its arch. In the fœtus it is larger than the aorta itself, and is a contrivance by which the blood, after being thrown from the left ventricle into the trunk of the pulmonary artery, is made to avoid passing into the lungs, by being conveyed directly through it into the aorta. This, therefore, in the fœtal state, is always found open and filled with blood. After birth it becomes obliterated and changed into a ligament. The same principle applies here as in the foramen ovale. If found closed, it is evidence that the child was alive at birth. If open it is not inconsistent with life as its closure is gradual, as will be more particularly noticed under another head.

Another fœtal opening is the *ductus venosus,* coming off from the umbilical vein, and opening into the vena cava ascendens. It is large enough to admit a common sized probe, and is the passage through which the blood passing through the umbilical vein goes directly to the cava and then to the right auricle of the heart. In the fœtal state this is always found open and containing blood. After respiration it becomes collapsed, after a while impervious, and is finally converted into a ligament. If obliterated, it is proof of respiration and life, but as this change requires considerable time, its being found open is no evidence of still birth.

The *umbilical vessels* consist of two arteries, being continuations of the iliacs, and a vein. The office of the former is to carry the blood of the fœtus to the placenta; that of the latter, to convey the blood from the placenta to the fœtus. After birth, these vessels also become obliterated, and converted into ligaments. Their obliteration is gradual, but takes place sooner than the other fœtal openings. When closed, the proof is conclusive that the child has lived subsequent to birth. When open, it furnishes no proof to the contrary.

The deductions to be drawn from the *umbilical cord*, and from the *cicatrization of the umbilicus*, come more properly to be considered in another connexion.

3. Another enquiry connected with the circulation, is *the distribution of the blood in the different organs of the body.* From the great difference in the mechanism of the circulation, we might be led to expect a different distribution in different organs. There are two organs in which this difference in distribution is particularly observable, and these are the *liver* and the *lungs.* The former is much larger prior to birth than afterwards. As the reverse of this occurs in the case of the lungs, it is supposed, with much reason, that the one increases at the expense of the other, and that the liver is the reservoir from which are furnished the supplies that, after the establishment of respiration, go to increase the weight and swell the volume of the lungs. It has, therefore, been suggested, that some relative proportion between the weight of the liver, as compared with that of the body, both prior and subsequent to birth, might furnish some indication in reference to the fact of life or death at the moment of birth; but the experiments made with the view of settling the truth of this, do not seem to have resulted in any satisfactory conclusion. The inferences, therefore, to be drawn from the distribution of blood in the liver, are not of much practical importance.

Much more is to be said in reference to the lungs. The change produced in them by respiration and life, is great and immediate. Prior to the establishment of this, no more blood was sent to the lungs than was necessary to contribute to their growth. Immediately subsequent, the whole mass of blood is made to pass through them, for the purpose of oxygenation. They are, therefore, distended and filled with blood, and this is caused as the result of respiration. One great test, therefore, by which is to be resolved the doubt whether respiration, and consequently life, existed subsequent to birth, is to ascertain whether the lungs are found filled with blood or empty. The means by which this is to be determined are two in number:

1. *Cutting into the substance of the lungs with a knife or sharp instrument.* If respiration has filled the lungs with blood, a free effusion will follow the incision; otherwise, little or no blood will flow out. 1 *Beck's Med. Juris.*, 349.

2. *Ascertain the weight of the lungs.* Lungs that have respired will be heavier than fœtal lungs, by as much as the weight of the blood which is found in them as a consequence of respiration. By simply weighing them, therefore, other things being equal, this question would seem to be easily determined. This is called the *static test.* To render this at all available, it is necessary either that some standard weight of the lungs be fixed upon, or that their weight in the two cases be compared with that of some third body, by which means we could arrive at the relative difference between them. In reference to the first, it has been proposed to ascertain the greatest weight which fœtal lungs ever attain, which would be the standard weight with which those submitted to examination must be compared. In case the latter exceeded the former in weight, it was evidence that respiration had taken place; if they fell below, that it had not. It was accordingly assumed, that the extreme weight of the fœtal lungs, a weight which they never exceeded, was eleven hundred and seventy grains. Chaussier, however, among one hundred and four cases of still-born children, found five in which the weight exceeded eleven hundred and seventy grains; one being eleven hundred and seventy three, another twelve hun-

dred and eighty-two, another twelve hundred and ninety-seven, another thirteen hundred and forty-three, and one very extraordinary one of sixteen hundred and thirty-seven. On the other hand, it has been ascertained, that the lungs which have respired do not, in a large proportion of cases, weigh as much as is here assumed as the standard. The real value of this test, therefore, must, on the whole, be very much circumscribed. When the weight of the lungs in question exceeds eleven hundred and seventy grains, it is pretty conclusive evidence that respiration has taken place. But when it falls short, as it does in a large proportion of cases, that evidence can only be comparative and presumptive. 1 *Beck's Med. Juris.*, 350-51.

Another test of much celebrity, is *Ploucquet's test*, as it is termed, which is founded on the relative weight of the lungs as compared with that of the whole body. The experiments made by M. Ploucquet, led him to state, as a general conclusion, that before respiration, the lungs were one-seventieth the weight of the whole body; after respiration, one-thirty-fifth; in other words, that respiration doubled the weight.

To the sufficiency of this test, several objections have been proposed; as, that there is no fixed proportion between the weight of the lungs and that of the body. M. Ploucquet seems to have deduced this conclusion from too limited a number of experiments. He made only three; two upon still-born children, and one upon a living child. In one of the still-born, the lungs as compared with the body, weighed as one to sixty-seven; in another, as one to seventy; while in the one born alive, the weight was as two to seventy, or one to thirty-five. The results of a great number of experiments made since, go to show, that if any fixed proportions exist, they are very different from those announced by Ploucquet. Hartmann makes the proportion to be, in an infant which has not breathed, as one to fifty-nine, and in one which has, as one to forty-eight. 1 *Beck's Medical Jurisprudence*, 352-3.

Other experiments make the proportion in the case first mentioned, to be as one to fifty-seven; and in the other, as one to thirty-eight.

Other objections have been urged against it, which are unnecessary to be here alluded to, as on the whole, there does not seem to be much value to be attached to this test. It would be well, certainly, to compare the weight of the lungs with that of the body, in any case of doubt or difficulty, and to ascertain the proportion. This, taken in connexion with other facts and proofs, may be of importance, but alone, can be of little value.

4. One additional fact, derived from the circulation, may be, *the presence of ecchymosis or extravasation of blood on the body of the child.* The *true ecchymosis*, presenting a slight tumor, and variegated discoloration of the skin, produced, as it is, by a rupture of small vessels, and bloody effusion from them into the cellular tissue, can only be found where the circulation was at the time existing. It has been suggested, that the gas generated by putrefaction may be sufficient to burst the veins, and that thus an outlet may be furnished to the blood, that may be insensibly carried along from more distant parts; so that considerable appearance of extravasation might be presented. To this it is answered, that by attending to the circumstances accompanying putrefaction, and the actual appearances presented by the body, it would be easy to determine whether or not the effusion was owing to this cause. 1 *Beck's Med. Juris.*, 359 – 60.

These marks of violence clearly established, and of so severe a character, and so inflicted, as not to have occurred during birth, may prove the death of the child even before respiration was established. A child may live after its birth without breathing long enough to have its life destroyed by violence. Its head may be suddenly dashed against the wall, its larynx compressed, or strangulation produced by tightening a ligature thrown around its neck, all before a single respiration has taken place. *Guy's Principles of Forensic Medicine*, 149 – 50.

It may be important, therefore, to have the means of determining, independent of a resort to the respiratory system, whether a death has been criminally produced or not. These means are two in number, the one being negative, the other positive.

The negative consists in the appearances presented by the body of a child which has died and undergone maceration in the uterus. This subject has already been in part alluded to, under the head of the signs or indications of life or death before or during delivery; although what was there said, had more direct reference to the putrefactive process. In addition, it may be observed, that the body, in such case, will appear shrunken and flaccid in every part; the chest and abdomen flattened; the ribs visible through the skin; the ilia prominent; the extremities soft and attenuated; the head soft and yielding; cuticle on the hands and feet white, thickened and wrinkled; the cutis itself discolored; the abdomen exhibiting a mottled appearance, blending a rose and ash color; skin a brownish red; the parts of generation a deep red color; the head and face partaking of the same, although in a less degree; the entire surface covered with a soapy fluid, so that it easily eludes the grasp; the cellular membrane infiltrated with a reddish serosity, containing in parts of it a substance resembling gooseberry jelly; the cavities filled with an abundant sero-sanguinolent fluid, and the viscera tinged with a reddish brown color, displaying their minute structure. These appearances will be the more strongly marked the longer the fœtus has lain in the uterus after being divested of life. They are distinct from the effects of putrefaction, and none of the odor of that process will be present. They will only be clearly presented where the fœtus, divested of life, has lain for some time in the uterus, and will not be perceptible if the death occured but a short time before the expulsion. *Guy's Principles of Forensic Medicine*, 149.

The positive proof of death, prior to respiration, having resulted from violence, is derived from the ecchymosed appearances before mentioned. The circulation is, of course, kept up in the fœtus, although rather languidly, and any severe injury during the continuance of it, cannot fail to leave its impression. The principles upon which our judgment should be based, are the same as in case of injuries to adults, which are to be considered under the head of wounds. A case is related by Devergie of infanticide in an infant that had not respired, proved by the existence of extensive wounds and marks of great violence on the head, with copious effusion of blood.

8. What are the proofs derived from the respiratory system in reference to the fact of life or death at birth ?

In this system exists the most important source of evidence in reference to the above enquiry. The passage from fœtal to adult life is marked by nothing more strongly, than by the changes which take place in the entire respiratory apparatus. What gives peculiar value to these changes, as connected with the solution of this problem, is that they are immediate. This feature renders them altogether superior in importance to those which occur in the circulating system. The latter are so gradual as to divest them of very much of their value.

The assertion, however, that the changes are immediate should be received with some qualification. The commencement of respiration is a more gradual process than may be at first supposed. It is rarely, if ever, fully completed in a few respirations, and sometimes requires many hours, days and even weeks, to render it complete and perfect. *Guy's Principles of Forensic Medicine*, 153.

The changes effected by respiration are principally to be noticed in the thorax and lungs.

1. As to the *thorax*. This, even on a very cursory examination, presents a wide difference in its appearance when examined previous and subsequent to respiration. If no respiration has taken place, it appears flattened, and as if it were compressed. The general size of it is small, and its internal capacity very much diminished. Its size and capacity are both adapted to the altered position and small size of the fœtal lungs which are contained within it. The diaphragm is also found raising high up into the thorax.

The act of respiration by increasing very considerably the size and volume of the lungs, and altering somewhat their position, throws the thorax out and renders it rounded and arched. Its internal capacity is enlarged in all directions. The diaphragm will be found depressed instead of rising high up into the thorax. It has been proposed to ascertain the dimensions of the thorax by actual measurement, in order to derive the utmost from this source of evidence. It is supposed, however, that occular inspection will be the best guide, and that a little experience in making examinations will insure the arriving at safer conclusions than to trust simply to measurements. 1 *Beck's Med. Juris.*, 360–61.

2. In regard to the *lungs*. These being the great organs of respiration, in them we might reasonably expect to find the greatest amount and variety of changes. These have reference to many different points.

1. The *volume or size* of the lungs is very much increased. This is owing principally to the distension of the air cells with air. The change produced in the external appearance of these organs by respiration or artificial inflation, is generally alone sufficient to enable any one to determine whether either had taken place or not. The effect, of course, will vary according to the degree of either. The air cells are irregularly grouped, angular in form, and situated in the substance of the lung. Occasionally they are found in groups of four, arranged in a perfectly regular and symmetrical manner; but more commonly they are irregular in shape.

The smallest quantity of air, however introduced, serves to develope some of the air cells on the surface of the lungs. When, therefore, these air cells appear developed, it is a fair proof of the admission of air, either by inspiration or artificial inflation. Of the different parts of the lungs, the edges and concave surface of the upper lobe of the right one, admit the air the most readily, and hence are the first that indicate that respiration or artificial inflation has taken place. *Guy's Principles of Forensic Medicine*, 151.

Many modes have been proposed to ascertain the precise amount of increase in volume in different cases. Among these that proposed by Daniel, is perhaps the best, but that seems not to be possessed of much practical utility.

The principle upon which he proceeded was, that if a solid body be plunged into a vessel of water, it will cause the water to rise in the vessel just in proportion to the quantity displaced, He proposed, therefore, to ascertain the different heights to which water in a vessel could be made to rise by putting into it lungs which had respired, and lungs which had not. As the lungs which had respired would not sink, he recommended that they should be placed in a wire basket, the volume of which should be ascertained, and which might afterwards be deducted from the volume of the lungs. The principal objection seems to be, that it does not appear that any conclusions can be drawn from the *absolute* volume of the lungs, which can be depended upon with any degree of certainty. 1 *Beck's Med. Juris.*, 362

2. There is also a difference in the *relative situation of the lungs.* Those lungs which have performed fully the function of respiration, will be found covering completely the sides of the diaphragm as well as its arch. Those which have performed simply an imperfect respiration, will be found occupying the lateral portions of the thorax. Where no respiration has taken place, they occupy only a small place at the upper and posterior part of the thorax, leaving the pericardium and the diaphragm, to a great extent, uncovered. *Ib.*, 362.

3. There is also a difference in the *shape of the lungs*, before and after respiration. Prior to respiration the lower margin of the left upper, and right middle lobes are sharp and pointed, while subsequent to that act they become rounded and obtuse. 1 *Beck's Medical Juris.*, 362. This is owing to the effect produced on their shape by the distension of the air cells.

4. Another point of difference between lungs which have respired, and those which have not, is in their color. Prior to respiration, the lungs are of a bluish red, deep violet, or brownish red color. This is subject to some slight variation. It is important to bear in mind, that an exposure to the atmosphere for a very short time, will materially change the color, so that all the observation that is bestowed upon this point, should be immediately upon the opening of the thorax. Lungs that have respired are of a pinkish red hue, which becomes lighter in proportion to the degree and extent to which that process has been carried. After a brief exposure to the air, the light red tint is changed to a bright scarlet. Where respiration is imperfectly established, the lungs fre-

quently exhibit a mottled appearance, especially about the anterior surfaces and margins, the light red being intermixed with the livid fœtal hue, and being slightly raised above the general surface of the organs. *Taylor's Med. Juris.*, 357.

The presence of disease in the lungs greatly modifies their appearance in respect to color. Where death has resulted from sanguineous engorgement of the lungs in children, the color will be of a dark brown, although respiration may have been going on for several days. 1 *Beck's Med. Juris.*, 363.

There is not, however, any great degree of certainty to be attached to the circumstance of color. Mr. Taylor says, I have known a child to live twenty-four hours, respiring feebly, and on examining the body, the color of the lungs was identical with that of the organs in the fœtal state. The variation in color, although a usual, is not a necessary consequence of enjoying life. Bernt says, that artificial inflation of the lungs never produces the scarlet tint of natural respiration. In this statement he is contradicted by Mr. Taylor, who says, that the circumstance of the lungs having a pinkish red color, is no infallible criterion of the child's having lived and breathed, for the artificial introduction of air by a tracheal tube or otherwise, in the attempt to resuscitate a still born child, is attended with the same physical change. *Taylor's Med. Juris.*, 358.

5. The *consistence or density of the lungs*, is another distinguishing feature upon which considerable reliance is placed. In the fœtal state and anterior to respiration, the lungs are dense and solid, having much of the consistence and feel of the liver. They have no crepitus either under the pressure of the finger, or when cut into with a knife. After respiration a considerable change takes place. They then become soft and spongy, and a crepitus is observed on pressing or cutting into them. This is owing to the presence of air in the air cells. 1 *Beck's Med. Juris.*, 363. On the surface are observable slight furrows obscurely marking the division of the lobules. When the lungs are full of blood these are scarcely visible, but when comparatively empty they are more distinct. *Guy's Principles of Forensic Medicine*, 151.

Although this difference in consistence and density, between lungs that are fœtal and those that have fully respired, is sufficiently marked, yet there is one difficulty which tends to embarrass its application, and that is, that putrefaction, to some extent, and artificial inflation to the entire extent to which it may be carried, produces, in this respect, the same result as natural respiration. There is also to be considered the degree to which either may be carried. A small quantity of air, however introduced, developes some of the air cells, particularly those situated on the surface of the lungs. The right lung, and especially the edges and concave surface of its upper lobe, admits the air most readily. *Ib.*, 151.

The appearance presented by the developed air cells will depend much upon whether the lungs are fresh and filled with blood. If they are so, the position of these cells will be marked by brilliant vermilion spots. In lungs containing less blood the color is lighter. When examined some days after the death of the child, their vermilion hue will have disappeared, and they will be found of a light rose color.

The distinctive marks by which artificial inflation may be distinguished from natural respiration, will be considered hereafter. Dr. Beck has remarked, (1 *Beck*, 364,) that incisions into lungs which have actually respired, are followed by a greater or less flow of blood, while in artificial inflation this is not the case. Mr. Taylor (*Taylor*, 362–3,) says, there is no perceptible difference in the quantity of blood existing in the pulmonary vessels of children, which have died without respiring, and those which lived and respired some time after birth. He remarks that after respiration, the excess of blood is distributed through the minute capillary vessels of the lungs, and that the pulmonary trunks, being thus almost divested of blood, furnish no evidence of respiration or the contrary. He also remarks, that the same observation will apply to the presence of blood in the substance of the lungs; that in performing the experiment, on several occasions, of cutting into lungs that had respired, and those that had not, he could perceive no well marked difference. This point is undoubtedly to be determined by experiment, but it ought certainly to be very fully made, before we finally reject a position that seems very reasonable, viz : that after the mass of blood has commenced circulating through the lungs, there is a greater quantity to be found in them than there was when only sufficient was sent there to contribute to their nourishment and growth.

6. *The specific gravity of the lungs* as a distinguishing characteristic. This falls under the next topic or head of enquiry.

9. What is the value, objections, and method of using, the Hydrostatic test?

This celebrated test, or the changes upon which it depends, was first suggested by Galen. It was first brought into view as connected with the subject of forensic medicine about the time of Morgagni. The early writers on Medical Jurisprudence say nothing of it. The work of Zacchias is silent on the subject. Haller notices it and some of its difficulties.

It is important first to understand the principle upon which this test depends. When a solid body is plunged into a fluid, it occupies a space in that fluid exactly equal to its own magnitude. The quantity of fluid then, so displaced, either equals in density, and consequently in weight, the solid which displaced it ; or on the contrary, one of the two must weigh more than the other. In the last case, which is most common, the quantity by which the heavier body surpasses the lighter, is called the specific weight or gravity. If a body is heavier than the fluid in which it is immersed, it will sink to the bottom by its specific gravity. If lighter than the same bulk of the fluid, a part of it will swim, and the remaining part which is immersed, displaces a quantity of fluid, which weighs exactly as much as the whole of the solid body.

To this test the lungs are submitted, with the view of ascertaining whether they are specifically heavier or lighter than an equal bulk of water. Fœtal lungs, as we have seen, are much more dense than those which have respired. The greater the density of a body, other things being equal, the greater its specific gravity. Hence as a general rule, whenever they are placed in water, being specifically heavier, they will sink to the bottom of the vessel. Lungs that have respired, having their air cells expanded, have a greater volume and less density. When, therefore, they are placed in the fluid their diminished density and increased dimensions, as a general rule, render them specifically lighter than water; and hence, when placed in it they will float. The necessary inference, therefore, is that if lungs which are subjected to this test sink in water they are fœtal, and that the child, therefore, must have been still born. When they float, they have respired, and that the child, therefore, must have been born alive.

This test is certainly recommended by its great simplicity, and the ease and facility with which it may be resorted to. It is on many accounts the most interesting and important ever proposed for the determination of a medico-legal question. It gathers its importance both from the numerous controversies to which it has given rise, from the purpose to which it is to be applied, and the high value usually assigned to it.

It should be premised that in strictness this test furnishes no direct proof, as to whether the child was born alive or dead. It points only to the fact of respiration, and goes to show in any given case whether that has taken place or not. It is true, the establishing the fact of respiration, is one of the means of proving the existence of life. But there are also other means of proof. The crying of the child, for instance, has been admitted as evidence of live birth on trials for infanticide. *Taylor's Medical Jurisprudence*, 364.

The objections that have been urged against the conclusiveness of this test, as proving either life or respiration, or the lack of it, have been of a two-fold character. First, that the lungs may float and yet the child may have been still born, and second that they may sink, and yet the child have been born alive. These objections will be considered in their order.

1. The first objection in the first class, is; that lungs which have not respired may be rendered specifically lighter than water, in consequence of having undergone the putrefactive process; and may, therefore, float when placed in it. The effect of putrefaction upon the lungs in reference to their specific gravity is not so clearly settled.

It seems singular, that any doubt should exist in reference to a fact apparently so easily proved. Still some assert that putrefaction renders them specifically heavier than water, and that they will sink instead of floating. Dr. Guy details some experiments made by him in the winter of 1839, in which, he says, that he found, in some instance, the lungs of still born children, when placed in water, as soon as they began to give out a putrefactive odor, began also to leave the bottom of the vessel, and gradually rose to the surface, where they remained for many days, and then slowly sank to the bottom. In other instances, large air vessels were formed on the surface of the lungs, but not in sufficient number to give buoyancy to them ; whilst in others, though the lungs gave out a strong putrefactive odor, there was no development of air vessels, and no tendency to rise to the surface, nor did they ever become buoyant either in the water in which they had stood, or in clear water. He admits that it is not easy to explain this remarkable difference, but he entertains no doubt, that when the lungs contain a large quantity of blood, whether in their entire texture, or only in a part of it, putrefaction takes place more readily, and the formation of gas is carried to a greater extent. *Guy's Principles of Forensic Med.*, 164.

From the experiments detailed by Dr. Beck, (1 *Beck*, 366 – 7) it seems pretty clear that where the lungs are in the incipient stages of putrefaction, they are rendered specifically lighter than water, and in that condition will float, although no respiration has ever taken place. This, therefore, will constitute a valid objection to the test, unless some means exist of distinguishing between the two cases. There are several of these means.

1. Lungs remaining in the thorax of a still born child are very slow in undergoing the putrefactive process. While in this situation they resist this process longer than any other part of the body except the bones. 1 *Beck's Med. Juris.*, 369. The lungs have presented a perfectly sound natural appearance, when the body had become quite putrid, when the scalp and bowels were distended with air. If, therefore, the rest of the body, especially the bowels and soft parts, which soonest putrify, are perfectly free from that process, it is fair to presume that the floating of the lungs does not arise from that cause.

2. Another means is derived from the fact that the putrefactive process, and the gases which are generated by it, are confined to the surface of the lungs; and hence by cutting into the centre of the lung, a portion can generally be obtained free from the touch of putrefaction. If the floating proceed from respiration, the internal part will be more likely to float than the surface.

3. Another criterion is derived from the appearance of the air-bubbles on the surface of the lungs. Air-bubbles which result from respiration, are hardly visible to the naked eye; but those which result from putrefaction are large, and run in lines along the fissures between the component lobuli of the lungs. It is therefore an easy matter to distinguish the one from the other.

4. A still further method of distinguishing, is in the greater ease and facility with which the gases developed by putrefaction can be extracted from the lungs. It is only necessary to squeeze in the hand any portion of the lungs containing gases of this description, and they will be so completely extracted as that the portion, if from the lungs of a still-born child, will immediately sink in water. No compression, short of complete disorganization, can force the air out of those lungs which have respired so effectually as that they will sink in water. 1 *Beck's Med. Juris.*, 368; *Guy's Principles of Forensic Medicine*, 166.

From all these, it appears very clear, that no real difficulty can exist that will prevent the medical jurist from distinguishing between the air-bubbles of respiration and those which result from putrefaction.

A far more difficult case to determine is, whether lungs which are actually putrid have respired or not. Medical jurists are not agreed as to the possibility of accurately solving tbis problem.

Those who take the affirmative, propose two characteristics. The first is, the existence of crepitus. They affirm that lungs which have respired, although undergoing the putrefactive process, have, nevertheless, a crepitus on being cut into, while those which have not respired, and float merely as the result of putrefaction, have no such crepitus. Another criterion, to which they attach greater weight, is, that in those lungs which have respired, after pressing out the matter developed by putrefaction, the lungs themselves will float in water, while those which have not, after being subjected to the same compression, will sink. 1 *Beck's Med. Juris.*, 369 – 70.

2. Another, under this class of objections, and which is somewhat more formidable than that just considered, is, that lungs, although from a still-born child, may be made to float from artificial inflation.

It must be here observed, in the first place, that the artificial inflation must be practiced before the lungs are removed from the thorax. In the accomplishment of this, there is no inconsiderable amount of difficulty—the mucus frequently filling the fauces of a new-born child; the resistance necessarily made by the thorax and diaphragm; and the obstacles tending to prevent the introduction of a pipe into the glottis, are all difficulties in the way of artificial inflation, and so strong as, by many, to be deemed insurmountable. There are many authorities that deny its possibility. Heister, Hebenstreit, Rœderer, and Brendel, particularly the latter, are all opposed to it. A late writer, Dr. Albert, denies that the organs, while lying in the chest, can be so filled with air, either by the mouth or by means of a tube, as to be rendered buoyant in water. In performing this experiment several times, he never found a trace of air in the air-cells, and he is therefore clearly of the opinion, that the objection itself has no foundation. The experiments related by Mr. Taylor, relative to the same point, serve to throw much doubt on the subject. In some cases, inflation was effected by a tube; in others, by the mouth. In one case, only about one-thirteenth part of the structure of the lungs had received air. In another, not a trace of air was found in the lungs, it having passed entirely into the abdomen. In another, although the attempts were continued for upwards of half an hour, not a particle of air was found to have penetrated into them. In another, no air had entered the lungs; and in another still, a small portion was found to have penetrated into them, which, however, was readily forced out by compression. *Taylor's Med. Juris.*, 369 – 70.

In all these cases, artificial inflation was resorted to for the purpose of resuscitating the child; and it should be borne in mind, that, for a medico-legal purpose, this is the only motive worth considering that would be likely to lead to artificial inflation. The motive of convicting the mother of the crime of murder, by resorting to the artificial inflation of the lungs of her still-born child, is so remote as not to be entitled to any consideration. This, therefore, together with all attempts artificially to inflate, in order to raise an objection to the hydrostatic test, should be thrown entirely out of view in our estimate of the force of this objection. The authorities in favor of the possibility of artificial inflation, may have arrived at their conclusions from attempts of the last mentioned character. Although, therefore, these authorities are numerous, and some of them very high, and although its possibility is generally admitted, yet the almost insurmountable obstacles in the way of it, very much weaken the objection, and render it really of very little practical force.

Admitting, however, as medical jurists generally do, the force of the objection, what are the answers that can be made to it?

1. Recourse is recommended to be had to the *static test*, upon the principle that if the inflation arise from natural respiration, the inflow of blood into the lungs will increase their absolute weight, which is ascertained by this test.

2. The second means of discrimination is based upon the fact above mentioned, viz., the change in the circulation consequent upon respiration. Artificial inflation can produce no change in the circulation. If, therefore, the arteries and veins which circulate the great mass of blood through the lungs, are found in a state of vascular distention, it is a fact going to show that respiration and pulmonary circulation have taken place. If, on the contrary, they are destitute of blood, and in a collapsed state, artificial inflation is the more probable.

3. *Pressure.* It is asserted by Beclard, that the lungs of a still-born child, which are made to float by artificial inflation, may, by pressure, be deprived of all the air introduced into them; while in lungs that have respired, this is impossible. There is

much contrariety of opinion in regard to the sufficiency of this criterion. The experiments of Professor Bernt, as also those of Professor Mendel, of Breslau, lead to a contrary conclusion. It was introduced into England by Mr. Taylor and Mr. Jennings. The former concludes that air introduced by artificial inflation may be expelled by compression, if the experiment be properly performed, and the pressure continued a sufficient length of time. The latter states that air introduced into the lungs by artificial inflation, may be expelled by pressure, so that the lungs will sink in water; and that after respiration, the air cannot be expelled from the lungs, without completely breaking down the structure of every part of the organ, so but what they will still continue to float. Mr. Taylor says, it must be admitted, that there are no means of distinguishing feeble respiration from artificial inflation. That in both these cases, the physical characters of the lungs will remain unaltered, and the pressure will in neither case destroy their buoyancy.

Dr. Guy says, that his own experiments have proved that lungs completely distended by artificial inflation cannot be made to sink by a degree of pressure short of that which will destroy the texture of the lung; and that lungs so distended with air differ from those which have breathed completely only by requiring somewhat more pressure to make them sink. *Guy's Principles of Forensic Medicine*, 167.

Thus he concludes, that where portions of lungs which have been inflated, are submitted to the same amount of pressure with portions which have respired, the only difference observable is one of *degree*, neither portion sinking till its texture is destroyed; but a less amount of destruction being necessary in the former than in the latter. *Ibid*, 168.

It follows, therefore, that pressure does not distinguish imperfect respiration from imperfect inflation, nor complete inflation from complete respiration. In conditions intermediate betweeen these two extremes, if, on submitting the buoyant portions of the lungs to pressure, the air contained in the air-cells can be expelled, and the lungs be made to sink without destroying or injuring their texture, we may be justified in stating that such portions of lung have been inflated.

4. *Incompleteness of inflation.* Art, it is said, can never completely inflate the lungs by the ordinary means, while they remain in the thorax. The right lung is more easily inflated than the left; and after strong attempts at artificial inflation, there will, it is said, remain the lower extremity of the left lung in its original collapsed state, and which will therefore float but imperfectly if at all. This is in all probability true, but it seems to admit of a ready answer, viz., that the same difficulty in permeating the extreme parts of the left lung, exists in imperfect respiration as in artificial inflation. It seems proved by the experiments of M. Portal and others, that the air-cells of all parts of the lungs are not simultaneously distended with air on the commencement of respiration; that the inflation commences in the right lung, and, after extending through that, gradually embraces the left, and continues until every part of that becomes also distended. There is, therefore, little if any force in this answer, which was first suggested by M. Marc. 1 *Beck's Med. Juris.*, 373.

3. Another objection belonging to this class is, that there may be an emphysematous condition of the lungs which may make them float in water, although respiration has never taken place. To constitute a valid objection, the emphysema can only be formed by some peculiar action of the tissues themselves; because, if the air be introduced through the air-tubes by natural respiration, it is not emphysema; and so, also, if its introduction be owing to artificial inflation, it then belongs to the objection under that head. Such seems to be the general understanding in relation to emphysema.

It sometimes happens, says Dr. Cummin, that infants suffer violence in the birth; the labor, perhaps, being tedious, and the mother malformed. The sides of the chest may be so pressed against the substance of the lungs as to do those organs injury; they become inflamed and puffy, containing air in large vesicles on their surface, and that is what is termed emphysema. It has been observed, that when it has become necessary to extract an infant by the feet, especially if the pelvis is narrow, the lungs, or portions of them, have floated, although the child certainly never had breathed. No appearances of putrefaction have, in such cases, been discoverable upon the body of the infant. Hence Lècieux has endeavored to explain it, by supposing that the lungs have suffered a sort of contusion; that an effusion of blood has taken place into their tissue, which, by undergoing a change, had given rise to the formation of some bubbles of air, and thus produced the buoyancy of some part of the lungs.

Dr. Guy is disposed to regard this as the incipient process of putrefaction, and remarks, that it is probably the most apt to occur in parts of the body filled with fluid, as in lungs simply congested, or in the cases of pulmonary apoplexy, which are apt to occur in children delivered after tedious labor, or extracted by instruments. He compares it to the case of effusion of blood on the brain, which can cause the rapid formation of gas under the membrane, before putrefaction has commenced so as to be recognized by its ordinary signs, and of this he says he has seen two well marked instances. *Guy's Principles of Forensic Medicine*, 163.

If this be but the incipient process of putrefaction, this objection may be considered as merged in that first mentioned. The air, thus formed, may, according to Chaussier, be easily pressed out by squeezing in the hand the portion of the lung in which it is found, and, after being thus squeezed, it will float in water. 1 *Beck's Med. Juris.*, 374.

4. It has been urged as a further objection, that the head of the child may be first born; that when the mouth is protruded, it may breathe, and loose its life before its birth is finally completed.

Although the occurrence of this fact is by some denied to be possible, yet there is undoubted evidence going to show not only the possibility of its breathing, but also of its crying, while in this situation. Its breathing may, in this manner, be tolerably perfect, while yet within the empire of intra-uterine life. This must, however, be an event of such rare occurrence as hardly to justify here a very full discussion of the force and effect to be given to it. Three things may be briefly remarked in relation to it:

1. The event itself is of very unfrequent occurrence:

2. Whenever it does occur it indicates such a capacity in the passages of the mother as to afford the best possible chance of its being born alive:

3. When its death occurs it will generally be owing either to the natural debility of the child, to pressure on the umbilical cord interrupting the fœtal circulation, to the cessation of labor pains, to unusual shortness of the umbilical cord, to a preternatural enlargement of the body of the child, or to a tumor on some part of its body, mechanically interrupting parturition. These are many of them causes that will be apparent on examination, and hence will themselves indicate the cause of death.

To these may also be added the fact—that although several instances are on record of the occurrence of this event, yet it is rare indeed that a death has ever taken place prior to delivery. There is not, therefore, much force to be attributed to the objection.

5. It has been further objected that a child may respire while yet in the womb, and before any portion of it is delivered.

To this it may be answered, that respiration while in the womb, and prior to the rupturing of the membranes, may be safely pronounced a physical impossibility. There is no well authenticated instance of this upon record.

Respiration may occur while the head of the chid is in the vagina, but it must either be in delivery by the feet, when the whole body but the head is protruded, or in the case of a head presentation, while the head is in the passages, after the membranes are ruptured, and when a hand is introduced to accelerate a tedious labor. The first could not well occur in medico-legal practice. And the second is of no appreciable value as an objection, as the introduction of the hand implies the presence and agency of the accoucheur or some one present assisting in the delivery. So also have there been instances, although extremely rare, where respiration has taken place in the uterus itself, after the rupture of the membranes, in the case of a face presentation;

the mouth of the child being at the os uteri, and the passages being dilated by the introduction of the hand of an attendant, the finger entering the mouth of the fœtus. Face presentations are of very rare occurrence, it being ascertained from observations made at the Hospital of Maternity at Paris, that one in three hundred deliveries was a fair average of the frequency of this kind of presentation. The peculiar circumstances of dilatation of the passages and communicating with the mouth of the fœtus would be probably of still rarer occurrence. In addition to all this it must be remarked that all the respiration that can possibly take place in these situations must be of so extremely imperfect a character, provided death occurs before delivery, as to render the objection of small moment; and if the child survive, and respiration be fully established, as seems to have been generally the case, it falls entirely to the ground. 1 *Beck's Med. Juris.*, 379, *et seq.*; *Taylor's Med. Juris.*, 375–6; *Guy's Principles of Forensic Medicine*, 174–5.

2. There is also another class of objections of quite a different character from those already considered. These are to the effect that a child may have been born alive, notwithstanding the lungs sink in water.

The first and most formidable objection urged under this class is, that the child may have breathed, and yet the lungs, in consequence of diseases of various kinds, may have their specific gravity so increased as to cause them to sink in water. Along with this may also be considered the further objection, that the respiration may have been of so incomplete and imperfect a character as that the lungs shall not have been rendered sufficiently buoyant to float in water, although the child was born alive. The former may possibly be the cause of the latter, or the latter may exist without the former.

The fact must be admitted that the lungs of adults are liable to be so affected by disease, as to render them specifically heavier than water, so that they will sink when placed in it. Peripneumony, tubercular formations, inflammation of the lung, a schirrous condition, may all have that effect.

It is to be borne in mind, however, that most of the diseases tending to hepatise or indurate the lungs, or to effect such a change in their structure as to render them specifically heavier than water after the occurrence of respiration, arise the most commonly from some functional derangement of those organs, and so far as that is a cause, could have no existence while they remained in a fœtal state. The causes that would result in the production of such diseased affections must, in that state, certainly be less numerous, although no one can doubt the possibility of their occurrence.

Disease may supervene after the establishment of respiration in cases that may become subjects of medico-legal enquiry, but these must necessarily be of very rare occurrence, and when it does take place would still more rarely affect the whole lung, so that portions of it would still remain having sufficient inflation to float in water. *Guy's Principles of Forensic Medicine*, 161.

Diseases that are the most likely to influence or change the condition of the lungs, in reference to their specific gravity, are those which tend to consolidate the air cells, as hepatisation and schirrous. There may be also in some cases œdema or congestion. In the latter case the cause of their sinking would be obvious. So also a hepatised portion of lung may be known by its greater firmness on being cut with a knife, and the impossibility of artificial inflation. *Taylor's Med. Juris.*, 364.

The answer made to this objection by Dr. Beck, 1 *Beck*, 386, is, "that the objection takes it for granted that the child has breathed; whether feebly or vigorously is a matter of no consequence. Some part, therefore, of the lungs must contain air, and although the quantity of it may be too small to cause the whole of the lungs to float, yet if they be divided into a number of pieces, and any of them remain on the surface, there can be no hesitation about the conclusion to be drawn. Foderê states that he frequently made experiments upon lungs that were schirrous, or had congestions of blood, and he uniformly found, that although they sunk when put into water entire, yet, when cut into pieces, some of them always floated." The same answer is also given to the objection that the respiration may have been sc feeble and imperfect that the lungs may not have received a sufficiency of air to make them altogether float in water.

There is, however, a class of cases as stated by Mr. Taylor, in which the lungs show no signs of disease, but appear after respiration simply to retain their fœtal condition. It differs from hepatisation, because they may be artificially inflated, which they are not susceptible of in the case of hepatisation. Life may continue many hours and even days, after respiration is established, and yet the lungs exhibit no indication of it. *Taylor's Medical Jurisprudence*, 364.

The explanation of this is no very easy matter. Dr. E. Jöig, of Leipsig, supposes that the act of parturition and the duration of the process, materially affects the system of the child; that if either, as a result of that, or of original weakness or defect in the fœtal constitution, the first inspirations made are feeble or imperfect, the organs of respiration will become only partially distended, the remaining portions still retaining their fœtal condition. This he considers as really a diseased state, and calls it "atelectasis," incompleteness of expansion. He supposes that children born after a very easy and rapid delivery are liable to it, and thus that it may be found in a mature as well as an immature child. It may arise from long continued pressure on the head during delivery; or from hæmorrhage from the cord; from all the causes that produce asphyxia in a new born child even in a slight degree; in fine from any cause tending very much to weaken the vital powers of the child before its actual birth. When, from any of these causes, only a part of the lungs become distended, the child may not afterwards acquire sufficient strength to fill the remaining portions, and thus may live on for hours or days or possibly weeks with this imperfect respiration, becoming occasionally convulsed, until it finally dies from exhaustion. Those portions of lung not distended become afterwards consolidated or hepatised, losing all traces of their vesicular structure. *Taylor's Med. Juris.*, 365.

A case is mentioned by Mr. Taylor of a child who died, at the age of six months, as was supposed from suffocation. The whole of the inferior lobe of the right lung, so far as color, density and structure were concerned, was precisely like the lungs of a fœtus. No air had penetrated into it, and its vesicular structure was perfectly destroyed. The whole lung floated in water, but the fœtal part, on being separated, immediately sank. This was considered a case of atelectasis. Another case is mentioned by Dr. Albert of a child that died thirty-six hours after its birth, the right and lower lobe of the left lung, being found in the fœtal state, and immediately sank when immersed in water. *Taylor's Med. Juris.*, 365.

This condition of the lungs may be more frequent than has generally been supposed. Professor Bernt relates a case of a seven months' child that died two hours after birth, and when its lungs were divided and placed in water, every fragment sank. Remer reports another in which the lungs both entire and divided, sank in water, although the child survived its birth four days. Orfila found, in a child that had lived eleven hours, every portion of the lungs when divided, to sink on immersion. In three other cases, two of mature children, the subjects having survived birth four, six and ten hours, the lungs sank when divided. Other instances are mentioned by Daniel, Schenk and Osiander. *Ibid*, 366.

The greater number of these instances were probably of premature children; but recent observations have shown that it is by no means confined to them. Mr. Taylor mentions two instances as having occurred under his own observation, the one of a mature male child in which the lungs sank in water although the child had survived its birth for the period of six hours; the other of a female twin, which survived twenty-four hours, and although the lungs were divided into thirty pieces, yet every piece, on being subjected to the test, sank. *Taylor's Med. Juris.*, 366.

The question may here arise, as to what is the exact value of the hydrostatic test, in trials for infanticide. On this subject the opinions of men, especially of the medical profession, have, at different times, considerably varied. Dr. William Hunter threw much doubt upon the sufficiency of the test to prove life or death at birth. Later authorities, particularly Dr. Beck, maintain that the test is capable of proving whether the child has been born alive or not. In the actual administration of the law, its sufficiency has always been viewed with doubt and distrust. It is no longer considered conclusive either in England or Germany. *Guy's Principles of Forensic Medicine*, 170.

The law in this country requires not merely *presumptive*, but *actual proof* that the child was born alive. The legal presumption is, that the child was born as it is found, viz., divested of life.

To rebut this presumption nothing short of clear, positive proof is sufficient. To assume the position that such proof is afforded by this test alone is certainly not sustainable. It may be fairly reckoned as one among the proofs going to show whether respiration has occurred or not in the case on trial. From the establishment of the fact of respiration, or its absence, arises an inference of very considerable weight in relation to the fact of life or death at birth.

It only remains to point out the method, or to give some practical directions relative to the manner of applying this test.

1. Before removing the lungs from the thorax care should be taken to note the general size and configuration of the thorax, whether it present a flattened or arched appearance; the position of the lungs within the thorax, more particularly their relative situation to the diaphragm and pericardium; their volume, shape, color, and whether any evidences of putrefaction be present.

2. Tie the aorta and vena cava near the heart, cut beyond the ligature, divide the trachea, and remove the lungs, together with the heart, from the thorax. Care must be taken not to injure the texture of the lungs, or that of the surrounding organs.

3. Before proceeding to cut into them a thorough examination must be made of their surface. This examination is important. If the surface be found of a uniform color, and the substance of a uniform firm texture, like that of the adult liver, it indicates that respiration has not taken place. If it is found mottled with spots of a bright vermillion hue, or of a rose color, and these spots contain developed air cells, then respiration or artificial inflation has taken place. The extent of these spots, and the

number of cells so developed, will measure the extent to which one or the other of these processes has been carried. These appearances will usually be so well marked, that the eye can detect the signs of the admission of air into the lungs where the quantity is too small to render any portion of their texture buoyant. *Guy's Principles of Forensic Medicine*, 172–3. Air which is the product of putrefaction is clearly distinguishable from this It is situated in the cellular membrane, and may be removed by the slightest pressure of the finger. The ecchymoses which are occasionally, although very rarely, seen on the surface of the lungs, are nearly of the color of the lungs themselves, and are distinguishable by having no traces of a developed texture. Additional observation should also be made with the view to determine the fact of putrefaction, and whether any indications of a diseased condition be present.

4. Provide a convenient vessel containing pure fresh water, unimpregnated with any saline matter, the temperature to be that of the surrounding atmosphere. This is a matter of some importance, because the specific gravity varies with the temperature. If the water be too hot, it will expand the lungs and thus tend to make them float; if too cold, it may contract the air cells, expel some of the air and thus give them a tendency to sink. Saline matters give the water a greater specific gravity, and impart to it a buoyancy that the pure fresh water does not possess. 1 *Beck's Med. Juris.*, 289.

5. Place the lungs, together with the heart, in the vessel of water, and observe whether they float or sink; and if the former, whether above the surface of the water or under it; and if the latter, whether they do so rapidly or gradually.

6. They should then be taken from the water, the pulmonary vessels tied, the lungs separated from the heart and weighed.

7. Next replace the lungs, without the heart, in the water, and see whether they float or sink, and in what way.

8. The two lobes should then be separated from each other. Each one of them should be subjected to the test in the same manner as both had been. It should be carefully noticed whether

there is any difference in their floating or sinking, and which, if either, floats or sinks the most readily.

9. Each lobe should then be divided into a number of pieces, some of which should be taken more from the surface and others from the centre, taking care to keep separate the pieces from each lung.

10. While cutting into the lungs, care should be taken to observe whether there be any crepitus, whether the pulmonary vessels are charged with blood; or whether there be any traces of disease.

11. Subject each piece to the test, and observe whether they all float or sink, and whether readily or not, and keep separate those that do, from those that do not.

12. If any float, submit them to a firm pressure between the thumb and finger, or in a twisted cloth, or mould them with the thumb in the palm of the hand. Then replace them in the water and observe whether they still continue to float.

13. In all unskilful attempts to inflate the lungs of a child through the mouth, air is introduced in considerable quantity into the stomach. There should be, therefore, an examination of that organ, with the view of ascertaining whether there is in it any contained air. The absence of it would tend to prove that artificial inflation had not been practised. *Guy's Principles of Forensic Medicine*, 174.

10. What inferences relative to life are to be derived from the state of the diaphragm, discharge of the meconium, and state of the bladder?

The state of the diaphragm is essentially modified by the act of respiration. Previous to that act, it is found high up in the thorax. As soon as respiration commences, the dilated lungs require more room, and the cavity of the chest must necessarily enlarge itself in every direction. From being compressed and flattened, it becomes elevated and arched. The necessary consequence is, that internally the diaphragm descends. The best mode of measuring the elevation or depression of the diaphragm, is by the corresponding ribs. 1 *Beck's Med. Juris.*, 391.

The discharge of the meconium shortly after birth, if the child is born alive, affords another indication of life at birth. This is a dark, pitchy matter, contained in the intestinal canal of the fœtus. It is considered by many to be bile collected in the fœtal liver, and propelled from that organ into the intestinal canal by the compression sustained by the liver on the commencement of respiration. The same compression, it is supposed, afterwards expels it from the intestinal canal. It has been asserted, that there is no instance in which infants born at the end of the ninth month have ever suffered this evacuation previous to their birth, but there is at least one instance to the contrary, mentioned on the authority of Denman. *Ibid*, 391.

As to the state of the bladder, it contains a considerable quantity of urine prior to birth. If found empty, it would raise a presumption that the child had been born alive, and had lived sufficiently long to pass its urine by its own efforts. This is not, however, deemed of much value. A child may possibly void its urine before birth, or it may be born alive and die before doing it. It would, therefore, be unsafe to place reliance upon that, especially when unattended by other proofs. 1 *Beck's Med. Juris.*, 391 - 2.

11. If born alive, how long did the child survive its birth?

The indications of the time which has intervened between the birth of the child and its death, are derived principally from the changes which take place in the organs of circulation, in the state of the umbilical cord, and in that of the skin. It may become desirable to ascertain this period of time in order to connect the deceased child with the supposed mother, or for other purposes included in the general investigation.

The peculiarities of the fœtal circulation have already been briefly alluded to. It is principally in the gradual closure of the fœtal openings, which occurs on the change in the circulation which takes place at birth, that the proofs of this intervening period of time are to be sought. These changes will be noticed:

1. In the *umbilical arteries and vein.* The change in these becomes sooner manifested than in any other of the fœtal peculiarities of circulation. The umbilical arteries, which are continuations of the iliacs, and whose office it is to carry the blood of

the fœtus to the placenta, are the soonest obliterated. Still, their obliteration is gradual, and is accomplished by a continual diminution in their caliber, and an increase in the thickness of their coats, more especially in the immediate neighborhood of the umbilicus. This is observable at the end of the first twenty four hours. At the end of two days, these changes extend from the umbilicus, embracing a greater part of the length of the arteries; and at the end of the third day, reach nearly to their termination in the iliacs. The degree and extent of their obliteration will therefore afford some indications of the length of time the child has survived its birth. 1 *Beck's Med. Juris.*, 343; *Guy's Principles of Forensic Medicine*, 177.

The changes proceed somewhat slower in the umbilical vein, the office of which is to carry the blood from the placenta to the fœtus. Very little change is observable in this during the first three days after birth, except that a slight contraction is noticed to take place. On the fourth day, this is more marked; and on the fifth, it is generally complete. Indications of the desired period of time may be collected from comparing the more rapid obliteration of the umbilical arteries with the slower obliteration of the vein.

2. The *ductus venosus*, the office of which is to convey a portion of the blood of the fœtus directly from the umbilical vein to the ascending cava, and through that to the heart. The establishment of respiration so changes the circulation that this organ is soon found in a collapsed state and empty of blood. The period at which this change takes place is variable. In twenty infants who had lived three days, this duct was found empty and obliterated. 1 *Beck's Med. Juris.*, 341-2.

The changes that take place in it are generally found to be the next that succeed those of the umbilical vein.

3. The *ductus arteriosus*. The office of this, in the fœtal state, is to convey a large portion of the blood sent into the trunk of the pulmonary artery directly into the aorta. The succession of changes by which this becomes divested of blood and converted into a ligament, usually next succeeds those of the ductus venosus. This succession has been made the subject of close inves-

tigation by Professor Bernt, of Vienna, and hence is known as the Vienna test. The vessel itself is about half an inch in length, cylindrical, and as large as the pulmonary artery. According to the observations of Professor Bernt, a very few respirations produce the effect of destroying the shape of the vessel, and of causing it to contract towards the aorta. 1 *Beck's Med. Juris.*, 339–40; *Guy's Principles of Forensic Medicine*, 178. It then assumes the shape of a truncated cone, the base of which is towards the pulmonary artery, and the apex towards the aorta; although he says sometimes the contrary of this is observed. If the child has survived its birth for some hours, or for a day, the cylindrical shape is again resumed, but very much diminished both in length and diameter. If life has continued for some days, or a week, the duct becomes wrinkled and shortened to the length of a few lines, while its diameter becomes diminished from the size of a goose quill to that of a crow quill. At the same time, there will be found to be a corresponding increase in the diameter of the branches of the pulmonary artery. At the eighth day, the duct is obliterated in half the children; and about the ninth or tenth, in all of them.

Some experiments have been subsequently made by others, particularly by Orfila, with the view of testing the correctness of Professor Bernt's conclusions. In eight cases detailed by Orfila, only four were found to present the appearances stated by Bernt. Considerable doubt is thus thrown upon the strict accuracy of the Vienna test. Nevertheless, this duct ought to be examined whenever it becomes desirable to ascertain the probable length of time the infant has survived its birth. 1 *Beck's Med. Juris.*, 340–41; *Guy's Principles of Forensic Medicine*, 178.

4. The *foramen ovale*. This is a septum between the right auricle and the left, its office being to afford a passage for a part of the blood directly from the right to the left auricle. This, in the great majority of cases, is the fœtal opening that last closes. The time of its closure is found to be extremely variable. Its final closure leaves a depression called the *fossa ovalis*. In one out of eighteen infants of a day old, it was found closed. So, also, in four out of twenty-two of two days old; in three out of

twenty-two of three days old; and in two out of twenty-seven of four days old. No precise period can be fixed for the obliteration of this aperture. It sometimes continues open for years, and there are some cases on record where it has never closed, and yet no dangerous consequences have resulted to the individual.

Professor Bernt, of Vienna, has here also called the attention of medical jurists to a succession of changes, preceding its final closure, which he supposes will indicate the period the child has survived its birth. These changes consist principally in the position of the aperture of the foramen. Anterior to respiration, this is found at the lowest part of the valve. As soon as respiration commences, it is gradually turned towards the right. It moves upward on the right side, until, after revolving around the right edge of the valve, it is found at the *upper* instead of the *lower* side of it. Here it usually disappears. These changes, according to Bernt, not only indicate the existence of respiration, but also the different periods of time during which it has continued.

Although there is, no doubt, something in this succession of changes, yet there is probably much less of regularity than is here stated; and so much accuracy is required in order to derive any safe conclusions from them, that to the generality of physicians it must be possessed of little value. It may be, however, useful in confirming other tests, and ought not, therefore, to be entirely disregarded. *Beck's Med. Juris.*, 337-8; *Guy's Principles of Forensic Medicine*, 178.

5. The *umbilical cord.* This comprises the umbilical arteries and the umbilical vein. In the child recently born, the cord is fresh, firm, round, and of a bluish color. Its vessels contain blood, and its size varies according to the quantity of gelatinous fluid it contains. The changes which occur in it, and which indicate the longer or shorter continuance of life, are—

1. The *withering* of the cord. This commences at the ligature, and gradually extends to the umbilicus. The time of its commencement is various, sometimes beginning directly after birth, sometimes not until some hours have elapsed, but being rarely

delayed longer than thirty hours, or two days, or at the farthest three days. Thus the withering of the cord takes place from the first to the third day after birth.

2. The *desiccation* or *drying* of the cord. It first assumes a reddish brown color, becoming semi-transparent. It then exhibits a flattened, shriveled appearance, finally becoming transparent, and of a color resembling parchment. Its vessels are obliterated, and it becomes tortuous and dry. The commencement of this process dates from one or two to four days after birth. The period at which it becomes complete varies from one to five days, the most usual period being three days.

This desiccation is a vital process. This is inferred, because the portion of the cord beyond the ligature, which is attached to the placenta, does not desiccate, but decomposes and putrefies like any other dead matter; and also, because the desiccation ceases as soon as life ceases; because it does not desiccate at all in a fœtus which is born dead; and because, on the dead subject, the cord undergoes a real putrefaction, which is altogether different from this desiccation.

3. The *separation* or *dropping off of the cord.* The period after birth at which this takes place is very various. From the fourth to the fifth day after birth, is the ordinary period at which the cord falls off, although it sometimes happens sooner and sometimes later. As a general rule, then, the cord withers during the first day; desiccation commences at the end of the first, and is complete on the third day. Between the fourth and fifth days, the cord drops off. All this must of course be liable to numerous variations and exceptions. 1 *Beck's Med. Juris.*, 346, *et seq.; Guy's Principles of Forensic Medicine*, 178 – 9.

It has also been remarked, that during the process of desiccation, there is a red or inflammatory circle formed around the umbilicus. This is regarded as the result of vital action, and hence as affording an indication that the child was born alive. It would seem, however, to be more frequently absent than present. It has also been present in still born children. It cannot, therefore, be regarded as furnishing much evidence either by its presence or absence.

4. *Cicatrization of the umbilicus.* This is the last change which occurs, and takes place usually from the tenth to the twelfth day. The general inferences to be drawn from this source are the following. If the cord be found withered, the child must have lived from a few hours to three days; if desiccated, from one to five days; if it have fallen off, from one to seven days; and if the umbilicus have cicatrized, from ten to twelve days. 1 *Beck's Med. Juris.*, 348 – 9; *Guy's Principles of Forensic Medicine*, 179.

Another source of proofs indicating the length of time the child may have survived its birth is derived from *changes in the skin.* There is a process of exfoliation of the epidermis which commences on the abdomen, and extends from thence successively to the chest, groins, axillæ, intercapular space, limbs, and finally to the hands and feet. The skin sometimes comes off in layers or scales, and sometimes in the form of a dust. This process varies in the time of its commencement, and also in its progress. It sometimes begins when the child is but a day old, and occasionally is delayed until the third or fourth day. It continues sometimes for thirty days, and, often in feeble and delicate children for two months. It is a vital process, differing from the separation of cuticle, which occurs as a consequence of putrefaction. *Guy's Principles of Forensic Medicine*, 179 – 80.

The following is a brief summary of the appearances that may be expected to be presented during some of the first days next succeeding the birth, and which indicate the period of time which has elapsed since that event.

After twenty-four hours. Skin firm and pale, or less red than at birth. Umbilical cord somewhat shriveled. Meconium discharged. Lungs generally more or less distended with air. Umbilical vessels, ductus venosus, ductus arteriosus and foramen ovale all open.

From the second to the third day. Skin possesses a yellowish tinge, epidermis sometimes appearing cracked, a change which precedes exfoliation. Umbilical cord brown and withered.

From the third to the fourth day. Skin more yellow, evident exfoliation of the cuticle on the chest and abdomen. Cord desiccated, of a brownish red color, flattened, semi-transparent and twisted, sometimes the red or inflammatory circle around the umbilicus. But this has been met with in children still born.

From the fourth to the sixth day. Cuticle separating in the form of minute scales, or of a fine powder. Umbilical cord separating from the abdomen usually on the fifth day. The process of separation is—that the membranous coverings become first detached, then the arteries and afterwards the veins. The fœtal openings, the ductus venosus, ductus arteriosus, foramen ovale and umbilical vessels in the majority of cases found closed.

From the sixth to the twelfth day. Cuticle desquamating on the extremities, cicatrization of the umbilicus generally complete by the tenth day after birth. There is sometimes an oozing of mucus from the cord which retards the formation of the cicatrix. *Taylor's Med. Juris.*, 380–81.

From all this we may be safe, perhaps, in deriving the following inferences.

1. That the closure of the fœtal openings, or of any one of them, is clear proof that the child was born alive, and had continued to live for some hours at least, and more than one day.

2. Their being found open affords no proof that the child was born dead.

3. From the succession of changes noticed in the closing of the ductus arteriosus and the foramen ovale, from the different appearances exhibited by the cord, and from the changes which take place in the skin, some conclusions may safely be drawn as to the length of time the child has survived its birth; although from the great variations noticed in these changes, it will be impossible to fix the time with any precision, or to make any other than general statements in reference to it.

12. How long has the child been dead?

It may become important to settle this question in reference to the reputed mother. Suppose it ascertained that she was delivered at a certain known time, the time a child had been dead, taken in connection with the period, if any, that had elapsed between its birth and death, would become a material question to settle.

The question last under investigation can only be settled by a reference to the changes that take place in the living body; the present, by reference to those which occur in a body divested of life. The solution of this question involves the examination of the putrefactive process. This will be made a subject of separate discussion hereafter, and to that discussion reference must be had in the settlement of this question.

All the causes, heat, humidity, access to air, that conspire to hasten on the putrefactive process in the adult, produce the same effect on the body of the infant. It has been remarked that the body of the infant putrefies more rapidly than that of the adult. It parts with its animal heat very fast, and the rigidity which follows is as great, and lasts as long in the infant, as in the adult.

Accurate experiments are yet wanting to determine the length of time occupied by the several steps of the putrefactive process, in infants and adults respectively. All that can safely be said now on this subject is—that, other things being equal, the putrefactive process is more rapid in infant, than adult bodies, and this should be taken into consideration in any question of this kind that may be presented. *Guy's Principles of Forensic Medicine*, 183; *Taylor s Med. Juris.*, 381.

13. Is the child really that of the prisoner, the reputed mother? Has she been recently delivered, and how do the signs of delivery correspond, as to time, with the appearances exhibited by the child?

The answer to the second question would furnish some means of answering the first. Most, or all of the subjects of enquiry involved in the second, have already been made matters of discussion, and need not be here repeated.

In reference to the first question, the attention should be directed to ascertaining the duration of the pregnancy, and comparing this with the probable age of the fœtus, No mere examination will be likely to acquaint one with the duration of pregnancy. To ascertain that, the probable age of the foetus should be compared with the appearances the female exhibits, and the account given by her of its duration.

The nature of the delivery may also be enquired into with the view of ascertaining whether it was natural or laborious. If the latter, there might be marks of injury upon the child. The reported age of the infant should be compared with the changes which the parts of the reputed mother may have undergone since her delivery, to ascertain as to their agreement or disagreement. Its probable age may also be compared with the state of the genital organs of the mother as to marks of injury or recent delivery. *Watson on Homicide*, 284–5. There may be also circumstances of a moral nature involved in this enquiry, with which the medical jurist, as such, has no concern.

14. What are the different modes by which the life of the child may have been destroyed?

This question assumes that several previous ones have been proved. It assumes that an infant, divested of life, is produced; that its birth is ascertained, so far as to connect it with its mother, whose conduct in relation to it whether innocent or criminal is the subject of investigation. It assumes also that proof has been furnished that it was born alive, otherwise no occasion would exist of enquiry into the modes by which its life may have been destroyed. This, therefore, is one of the last enquiries presented in infanticide.

These modes of death may be very various, but they may all be ranged under two classes, viz., those which are *criminal* and those which are *accidental*. As it may, in every case, be necessary to discriminate to which of these two the death is owing, it becomes important to examine both somewhat in detail.

15. What are the various *criminal modes* usually resorted to for the purpose of destroying life, and the proofs that evidence them?

Some of these modes are unattended with any external appearances indicating a resort to violence. In such cases as there is nothing clearly indicating a resort to destructive means, it may, and more probably will, be impossible for the medical witness to say whether the death was brought about intentionally or not. Such, for instance, is

1. *Suffocation*. Here, slight changes only will be effected. All that is commonly noticed is lividity about the head and face, and slight congestion in the lungs. This mode of death may occur either prior to respiration or subsequent to it. A child may be

born so enveloped in the membranes as to be suffocated before it is liberated, and where for many minutes, it has shown strong signs of life. So, also, immediately on being born, it may fall into the midst of discharges, or on a soft bed, or may be prevented by some similar obstacle from breathing at all. An infant, especially prior to respiration, may be easily destroyed by suffocation.

So also after the commencement of respiration, and when the pulmonary tests may show the establishment of that function, life may be destroyed by suffocation, which may be either accidental or intentional. The child after breathing, may fall into fluid discharges, or be overlaid in bed, or have its mouth obstructed by accumulations of mucus, and thus its death, from suffocation, may innocently occur. So also its death may criminally be brought about by placing wet cloths over its mouth, or thrusting them into it, or by allowing the child to remain closely compressed under the bed clothes, or by its head being thrust into straw, feathers, or such substances. An examination ought always to be made of the mouth and fauces to ascertain if any foreign substances, such as wool, straw, feathers, &c., are to be found there sufficient to indicate the cause of death. In the case of the *Queen vs. Mortiboys*, tried in 1841, the body was discovered in a box containing wool, was lying on its abdomen with its face raised and mouth open, a small quantity of fine flocks of wool was found in its mouth, and a comforter had been passed twice round the neck, having been tied the second time in a single knot over the chin. The ligature had produced no mark around the neck either externally or internally. The brain was congested. The pulmonary tests showed respiration or inflation of the left lung. Death was referred to obstructed respiration, caused partly by the ligature, and partly by the wool, but principally by the latter. The prisoner was acquitted. *Taylor's Med. Juris.*, 385–6.

2. *Drowning.* A woman may cause herself to be delivered in a bath, the child being forcibly retained under water until its life was extinct. In such case no evidence of the mode of death would be found upon the body. If the drowning be subsequent

to the commencement of respiration, then precisely the same questions will present themselves, as in the case of persons found dead from drowning, and the same indications of death, from that cause, are to be sought for in the organism of infants as in those of adults. These questions and indications are subsequently discussed.

3. *Cold.* Death from cold, as we shall see hereafter, leaves few traces upon the organization. The evidence is mostly circumstantial. The situation in which the body is found, the season of the year, the temperature of the air, &c., are all matters to be considered. The body should be examined to ascertain if there is not some other cause of death to be found. A new born infant is no doubt more easily affected by a low temperature than an adult, and its death is, therefore, more readily effected by exposure to cold. *Taylor's Medical Jurisprudence*, 387; 1 *Beck's Med. Juris.*, 397.

4. *Starvation.* It is not clearly settled how long a new born infant is enabled to exist without food. Foederè says the neglect of it for twenty-four hours is not unattended with danger. This mode of death necessarily implies that life has been for some time enjoyed, and in this case, therefore, all the tests that go to establish the fact of life, should be resorted to in the first place. The signs of death by starvation are the same in the infant as in the adult, and will, therefore, find a more appropriate place for consideration hereafter. Generally starvation will also be found accompanied with exposure, but whether they are wilful or accidental will be a question of fact for the jury. *Taylor's Med. Juris.*, 387; 1 *Beck's Med. Juris.*, 397–8.

5. *Wounds, fractures and injuries of various kinds.* Under this head is included a very numerous class of agencies, which are probably among those the most frequently resorted to for the purpose of destroying the life of the new born child. In case wounds, contusions or other injuries are found upon the body of the child, the same questions substantially will arise, as in the case of persons found dead from that cause. Some additional questions arise, growing out of the peculiarity of the case. One of these is, whether the injury occurred in the course of labor. Until

quite recently the general supposition has been, that fractures of the cranium in new born children were always indicative of violence. It was not supposed possible that there existed any cause, prior to delivery, that could produce such an effect. It is now, however, well settled that fracture of the bones of the cranium may be produced during labor. A case is related by Siebold, of a woman with a very narrow pelvis, who was delivered by the efforts of nature alone, of a well formed still born female infant, having three fissures in the left parietal bone, and one in the left frontal bone. Michaelis also reports the case of a woman with a well formed pelvis, who was delivered of a child alive at birth, but which expired shortly afterwards, and on the right parietal bone, which during birth had been diverted under the promontory of the sacrum, there were found no less than five fractures. A number of cases of fractures that occurred during labor, are collected by Dr. Schwörer, and altogether a sufficient number have been observed to establish clearly the possibility of their occurrence. *Taylor's Med. Juris.*, 389 ; *Guy's Principles of Forensic Med.*, 190.

The fractures, thus arising, are generally observed to be slight, commonly presenting merely the appearance of a fissure in the bone, usually commencing at the sutures and extending downward for about an inch or less into the body of the bone. They are accompanied with extravasation of blood in the same manner as fractures produced after birth. The question that will here occur is, whether there are any points of distinction that will enable the medical jurist to discriminate between those which occured during delivery, and those which were produced at a subsequent period. No very satisfactory answer can be given to this question. No other difference can be expected than one in degree ; these fractures, as already remarked, being generally slight, and those which are the result of violence, inflicted with the intent to kill, being usually much more severe, extensively lacerating the scalp ; the bones being driven in, and the brain protruded.

A question, however, may arise whether even the latter class of injuries, may not have arisen from the suddenness of the labor, the expulsion of the fœtus by the violent contractions of the uterus, so that its head coming in contact with a hard substance, as the floor or pavement, may have thus been the innocent cause of their production. In order that such a result should be brought about, it is important, if not necessary, that the woman should be delivered while in the erect posture. Although this is by no means common, yet there are instances of its occurring, sufficient certainly, to establish the possibility of it. The question of its possibility occurred in a case mentioned in the *American Journal of Medical Science, vol.* 17, *p.* 329, in which there was a contrariety in the medical testimony upon that point. As it, however, appeared that instances of that kind of delivery had actually been witnessed, no doubt seems to have been entertained but that it was a possible occurrence and might, therefore, take place. Many cases of that kind are mentioned by writers. See *Guy*, 188 ; *Ryan*, 142, &c.

From the numerous experiments and great number of cases collected by Dr. Klein, it would seem that fractures of the cranium, under these circumstances, must be of very rare occurrence, He reports one hundred and eighty-three cases, in which the women were rapidly delivered while sitting, standing, or inclined on the knees, the child falling either on the ground floor, or on bare boards, or the pavement, and yet out of the whole number, there was only one instance in which the child was killed, and, so far as could be ascertained by external examination, there was no case in which the bones of the cranium were fissured or fractured. Of these instances one hundred and fifty were delivered standing. He asserts that there was not one infant in the kingdom of Wurtemburgh, who had experienced this accident whose skull was fractured, and that all recovered. *Ryan's Med. Juris.*, 142 ; *Guy's Principles of Forensic Medicine*, 189–90.

The experiments made by Chaussier upon the dead bodies of children would seem to lead to a different conclusion. Fifteen still-born children were allowed to fall perpendicularly, and head foremost from a height of eighteen inches on a stone floor. In twelve of the number one or other of the parietal bones was broken. The fractures were greater in proportion as the length of fall was increased. There are two points of difference in the two cases. In the first the direction in which the body is projected is more oblique, and the fall is not so instantaneous.

Whether these are sufficient to explain the difference in the result or not, it is perhaps difficult to say; but as the cases collected by Dr. Klein are precisely those in which the question would arise in trials for infanticide, they will have much more confidence attached to them than the experiments of Chaussier. It will follow then that instances in which fractures occur from this cause are very rare, although the possibility of their occurrence is clearly established. Whenever a suspicion that this may have been the cause of death exists, examination should be had into the circumstances both anterior and subsequent. The volume of the infant's head may be compared with the dimensions of the pelvis. The duration of the labor should, if possible, be ascertained; the position of the woman when the infant was expelled; the height of the fall; the substance with which the head might have come in contact; and particularly the state of the umbilical cord, which, in such a case, ought to be ruptured either at the placenta or umbilicus, and not in the middle, while its extremity should present the sign of laceration. *Ryan's Med. Juris.*, 142 – 3.

The somewhat peculiar requirements of the law have thrown considerable embarrassment in the way of medical testimony. According to the decisions in the English courts a child is not considered living in law, so that its destruction can be murder, until its body is entirely born. *Taylor's Med. Juris.*, 388.

Several cases on this point are collected in *Taylor*, 377. In *Rex vs. Brain*, it was held that a child must be wholly in the world in a living state to be the subject of murder. In *Rex vs. Sellis*, Mr. Justice *Coltman* held, that to justify a conviction for child murder, the jury must be satisfied that the entire body of the child was actually in the world in a living state, when the violence was offered to it. This doctrine is perhaps more clearly expressed by Baron Parke in a case of infanticide tried in 1841, reported in *Guy's Hospital Reports, April*, 1842. He charged the grand jury that " with respect to all cases of infanticide, there is a degree of doubt whether the infant has been born alive. The law requires that this should be clearly proved, and that the whole body of the child should have come from the body of the parent. If it should appear that death was caused during delivery, then you will not find a true bill." It should be here, however, remarked, that the law regards the time at which the death occurred, in fixing the character of the crime, and not that at which the act was committed. The following case reported in *Archbold*, 345, will illustrate this. A man by the name of Senior was tried in 1832 for manslaughter, in killing an infant by inflicting injuries on it at its birth. The evidence showed that when the head of the child presented, the prisoner, who practiced midwifery, by some mismanagement, fractured, and otherwise so injured the cranium, that it died immediately after it was born. The point was here taken that as the child was not born at the time the wounds and injuries were inflicted, the prisoner could not be guilty. The judge held that as the child was born alive and died, the case might be one of manslaughter. This opinion was afterwards sustained by the other judges. Thus the criminality is made to depend upon the period at which the injuries proved fatal, and not upon the period at which they were inflicted upon the body of the child.

It must be easily seen that it will be difficult, if not impossible, for a medical witness to satisfy an enquiry as to whether the whole body of the infant was born or not at the time of the infliction of the injury; because the fact as to whether the body was in part or wholly born would make no difference as to the appearance of the wounds. The most legitimate inferences derivable from them are whether they were inflicted during life or after death, and whether the whole body was in part or wholly born at that time can make no difference.

In addition to the questions already stated, the medical witness will be expected to state whether, in his opinion, the wounds were inflicted before or after birth; whether they were in fact the cause of the death; and whether they originated in accident or criminal design. These questions all arise for discussion in the case of persons found dead, and to that head the further consideration of them is referred.

A mode of death that has been sometimes resorted to with success, is *the introduction of sharp pointed instruments in different parts of the body.* Some time since, a midwife was executed in Paris for murdering several children by plunging a needle into the head, while it was presenting at the os externum. A similar murderous practice is mentioned by Brendel and Belloc. Sharp pointed instruments, as a means of destroying life, have been thrust into other parts of the child, such as the temples, inner canthus of the eye, spinal marrow, the neck, the thorax, about the region of the heart, and the abdomen. Sometimes, also, down the throat, and up into the rectum. 1 *Beck's Med. Juris.*, 398–9; *Taylor's Medical Jurisprudence*, 388; *Guy's Principles of Forensic Medicine*, 186.

In cases of this kind, dissection is the only means likely to reveal the cause. Where suspicion is entertained that an instrument has penetrated the brain, the head should be thoroughly shaved; when, upon examination, it will present a slight ecchymosis around the puncture. Pressing this into the substance of the brain, the nature and extent of the injury will be ascertained. The same course must be pursued in punctures which are discovered in other parts of the body.

Another mode of death sometimes resorted to, is *luxation and fracture of the neck.* This is accomplished by forcibly twisting the head of the child, or pulling it backwards. In these cases, the vertebræ are fractured, the ligaments ruptured, and death produced by the injury inflicted upon the spinal marrow. The local derangements will, in such cases, reveal the cause of death; the position of the head, the fracture of the first or second vertebræ, and the extravasation of blood among the cervical muscles, the latter, more particularly, showing that the violence was committed upon a living subject. 1 *Beck's Med. Juris.*, 401.

This form of injury cannot take place prior to the delivery of a part of the child, and is therefore evidence of intentional violence. It may, however, occur before the entire delivery.

6. *Strangulation.* This is not an unfrequent form of child

murder, and in its investigation are presented many difficult and embarrassing questions. In the first place, it may be stated that the general signs or indications of death from strangulation are essentially the same in the infant as in the adult, but there are several questions arising in the former case, which do not in the latter. But although in the adult a red and swollen appearance of the face and head is indicative of death from strangulation, yet in the infant such appearances must not be hastily assumed as affording such clear indications. In natural births, nothing is more common than for the head and face of the infant to appear swollen and of a deep color at birth, which gradually disappears in a few days, if the child live.

Where appearances indicate that strangulation has been the mode of death, the first question, perhaps, which would naturally present itself, would be, whether that had been effected by the accidental twisting around the neck of the umbilical cord, or whether it was the intentional act of the mother. When the cord happens to be long, it sometimes occurs that during delivery, it becomes accidentally twisted around the neck of the infant so tight as to cause death by strangulation. It has been by some supposed, that, in such case, there would be no livid or ecchymosed mark or depression on the neck, such as indicates death in the adult from this cause. To this, however, it is answered, that this is not a constant, although an usual accompaniment of death in the adult from this cause; and also, that it is now ascertained that the umbilical cord may produce a livid or ecchymosed depression. *Taylor's Med. Juris.*, 391.

Still, the fact remains certain, that when the mark is found to be deep and much ecchymosed, with extravasation of blood beneath it, accompanied with ruffling or laceration of the skin, it cannot proceed from the umbilical cord, but must be attributed to other means. *Ibid*, 392.

Here, also, it should be observed, that the legal requirements are of such a character as to render death, by the accidental twisting of the umbilical cord, a matter of difficult if not of impossible occurrence. The rule has already been adverted to, that the entire and complete birth of every part of the child must be effected before it could be considered as legally alive. Another rule has also been laid down, which, although not in all respects inconsistent with the one just mentioned, is nevertheless a very different one. That is, the rule announced by Justice Parke, in the case of *Rex* vs. *Enoch*, *Archibald*, 367: "that there must be an independent circulation in the child, before it can be accounted alive." This occurs upon the establishment of respiration, when the blood no longer passes from the mother to the child. It may take place when it is half born, and if it be taken as the only test of life, would, in that respect, conflict with the rule above mentioned. However that may be, let either or both rules be adopted, it is quite obvious, that after the establishment of an independent circulation, or after the entire birth of the child, the accidental twisting of the umbilical cord around its neck so as to produce strangulation, would be a very rare and difficult occurrence.

Cases have occurred, in which the umbilical cord has been made use of as a means of strangulation. *Taylor's Med. Juris.*, 391–2.

Thus a case of this kind is stated: The umbilical cord was twisted once around the neck, passed under the left arm, over the shoulders, and round the neck again, forming a noose or knot; which, pressing upon the throat, must have caused strangulation, as the tongue was protruded, and there were other clear indications of the child's having been strangled. The hydrostatic test showed that the child had respired. *Taylor's Med. Juris.*, 392.

The other questions that arise, the principal one of which is, whether the strangulation was the cause of death, or intended merely to conceal that cause, belong equally to Infanticide and persons found dead, and require, therefore, no discussion here. It should, however, be remarked, that, so far as the external marks of strangulation are concerned, there is no difference in the appearances, whether the constriction takes place during life or immediately after death, and while the body is yet warm. *Ibid*, 393.

Strangulation may also be effected by the pressure of the fingers on the throat, in which ecchymosis may be found corresponding with the cause.

7. *Poisoning.* This is a form of death rarely resorted to in cases of infanticide. A case is mentioned by Mr. Taylor, as the earliest he had ever known, in which the child was two months of age. Arsenic was administered, and the child died in three hours and a quarter. This could hardly be termed a case of infanticide. If cases of this kind should occur, the rules to be observed in the examination of the stomach and intestines, and the substances contained within them, are the same for the infant as for the adult, and may therefore be referred to the subject of poisons.

8. *Intentional neglect of tying the umbilical cord.* It has been a matter of much dispute whether the tying the umbilical cord, in case it be either cut or torn, is a necessary precaution to save the life of the infant. By those who deem it unnecessary, it is urged, that the umbilical vessels, whether cut or torn, have a sufficient contractile power to prevent any great loss of blood; that in other animals, this tying of the cord is unnecessary, and therefore it must be useless in the human species; and finally, that as, in some surgical operations, the arteries contract spontaneously, so they should have a similar contraction in the cord. To the first, it is answered, that it is but another mode of saying, that, under such circumstances, a fatal hæmorrhage does not take place. To the second, that there are points of difference between the structure of the human cord and that of animals. In animals, the umbilical vessels are full of rugæ or folds; the cord is also smaller than in the human species; and when the animal is born, the vessels are in a manner closed by a kind of cellular structure. Besides, in them, the cord is never *cut*, but is *torn asunder*, which gives to the vessels a strong tendency to contract. To the third, it is answered, that arteries of small size may contract, but in those of the same magnitude as the umbilical, fatal hæmorrhage may result from not securing them.

There are, however, some instances on record going to show, that fatal hæmorrhage may result from a neglect in tying the umbilical cord. There are also a number of other cases mentioned by M. Klein, in which the cord was ruptured, and in some cases close to the abdomen, without being attended by fatal umbilical hæmorrhage. The mere absence of the ligature should, therefore, never be taken as affording, of itself, conclusive evidence of death by hæmorrhage. 1 *Beck's Med. Juris.*, 393, *et seq.*

The following are enumerated as the indications of death by hæmorrhage from the umbilical cord:

1. Paleness of the surface, with a peculiar waxy appearance:

2. Paleness and want of color in the muscles of the internal viscera:

3. Absence of the usual quantity of blood in the heart and blood vessels. It is not necessary to raise an inference of this kind, that the vessels should be found entirely empty. It is said that if three ounces of blood can be collected, it may be presumed that the child has not died of hæmorrhage.

9. *Causing the child to inhale air deprived of its oxygen, or gases positively deleterious.* This is a species of suffocation, and might have been included under that head. It occurs when the child, as soon as it is born, is shut up in a tight box, and thus excluded from the atmosphere. Infants are in general less able to sustain the deprivation of oxygen, than adults. In one case, one was suffocated by some drunken men repeatedly blowing out a candle and holding the wick under its nose. In such cases, the absence of any other assignable cause of death, together with the circumstances under which the child is found, may furnish the means of arriving at conclusions as to the way by which death has been effected.

16. What are the natural or accidental modes by which the life of the child may have been destroyed?

There may be reckoned three classes of causes which may, either at the time or immediately subsequent to delivery, result in producing the death of the infant, without any blame being attached to the mother or any one else. These are—

1. Certain accidental circumstances occurring either during, or immediately after delivery, such as the following: The child sometimes comes into the world in a state of supination, and

may loose its life in consequence of not being removed from that state. 1 *Beck's Med. Juris.*, 404.

The manner in which death is produced from this cause, is that the mouth of the infant is so closely applied to the bed-clothes, or other substances in its way, or is so completely immersed in the pool made by the uterine discharges, as entirely to prevent the occurrence of respiration.

The labor may also be so sudden and rapid, that the child may loose its life from that cause. There are instances on record, where the expulsion has been so sudden, that the child has been thrown out on the floor, or in the utensil under a night-chair. The labor, in such cases, may very probably be attended with faintings or convulsions of the mother, so as to render her incompetent to afford any assistance to the child. 1 *Beck's Med. Juris.*, 405.

In such cases, the child may die from the injury, or expire from suffocation. It is obvious, however, that although these are cases of possible occurrence, yet their probability is very remote, and when they do happen innocently, there is generally sufficient evidence to be gathered from all the attendant facts and circumstances.

There may be accidental hæmorrhage from the umbilical cord prevailing to a sufficient extent to destroy the life of the child. We have already seen that there may be an intentional neglect to tie the umbilical cord. This hæmorrhage may occur from an accidental rupture and neglect properly to tie it. It should be borne constantly in mind, that those cases which are the most likely to become subjects of medico-legal examination, are the very ones in which we should expect to find the greatest degree of ignorance on the part of the mother. A case involving this question arose in the *Queen* vs. *Dash*, *in* 1842, referred to in *Taylor*, 383. There was no doubt in that case but that the child had breathed, and that its death had been caused by hæmorrhage from the lacerated umbilical cord. The medical witness testified that the cord might have been torn through by the weight of the child during labor, and the jury acquitted the prisoner on the ground that she might have been ignorant of the necessity, or not have had the power, to tie the cord.

The child may die from compression of the cord during labor. In the case of a foot or breach presentation, the cord, under strong uterine contraction, may be so compressed, as to arrest the circulation between the mother and the child, which would result in the death of the latter. So also during delivery, the cord may become twisted around the neck of the child, and thus prove the cause of its death. This latter has sometimes produced death before parturition. This is not properly strangulation, as it occurs before the establishment of respiration. It is simply the arrest of the circulation.

A child may also die from prematurely tying the umbilical cord. It is well known that circulation by the cord and respiration are vicarious functions. That both cannot exist together, and that the one must cease before the other can become established. It is accordingly laid down as a principle, that the cord should never be tied, or divided, until respiration has become perfectly established. Dr. Dewees states, "that he has seen several instances of death, and this of a painful and protracted kind, from the premature application of the ligature." Its too hasty application, in such cases, has been followed by breathlessness and lividity of countenance.

The death of the child may also be caused by a protracted delivery. This may result either from an injury being inflicted on the head during the violent contractions of the uterus, or to an interrupted circulation before respiration is established. In either case, a child, if delicate and feeble, may die from exhaustion.

So also death may arise from the debility of the child. This would be the most likely to occur in a premature birth. In such, existence may continue for several hours with a very feeble respiration, and then death may supervene. These cases may generally be recognized by a want of development in the body, and evident signs of immaturity.

2. The second class of causes embrace all congenital malformations of organs of such a character as to produce death at birth or soon afterwards.

These malformations, in order to be fatal, must be of large and important organs. Those of the heart and vascular system may be—a congenital opening between the two ventricles; the heart consisting only of one auricle and one ventricle; the aorta arising from both ventricles; and the pulmonary artery impervious at its origin. There may also be malformations of the respiratory organs; of the alimentary canal; the stomach, and the intestinal canal, especially that part of it constituting the rectum. 1 *Beck's Med. Juris.*, 409, *et seq*; *Taylor's Med. Juris.*, 384. It is not at all important to go into a minute consideration of these, because if they are of so marked, and severe, a character, as to be entirely inconsistent with the continuance of life at birth, they will be obvious, and present themselves as the cause of death on a very slight examination.

3. The third class includes various diseases, either congenital, or occurring immediately after birth. Those which are of so severe a character, as to prevent the establishment of new vital processes at birth, or to render the continuance of any such impossible, have their seats in three of the most essential organs, viz: the heart, lungs and brain.

In regard to the first, there are none on record that result in the destruction of life so suddenly, as to raise any questions of a medico-legal nature. *Guy's Principles of Forensic Medicine*, 183.

There is, however, the *Morbus cœruleus*, *cyanosis*, or *blue disease*, formerly attributable to the foramen ovale remaining open after birth, which sometimes produces death in a few hours. Besides the peculiar color of the skin during crying, or any other effort, from which the name is derived; the symptoms are—disordered circulation, disturbed respiration, diminished temperature, sometimes accompanied with laborious breathing, fainting, palpitation, and suffocation. It is during the prevalence of these latter symptoms, that life is endangered and not unfrequently lost.

Diseases of the lungs may be hepatization, pulmonary apoplexy, pulmonary tubercles, œdema, and œdema lardariforme, being a mixture of œdema and schirrhus. These may either affect the entire structure of the lungs, or any part of them. Where the entire structure is affected, life can continue but for a very brief period, and in such cases the pulmonary tests will generally decide that no respiration has taken place. Where the disease is partial, the medical witness may be required to state what agency it had in the production of death. These cases can seldom be attended with much difficulty; as the presence of the disease, whether affecting the whole organ or only a part of it, will be apparent on examination. That peculiar condition of the lungs termed *atelectasis*, consisting in imperfect expansion, is not here included, as that probably depends on a defect of innervation, and not on disease.

The brain and spinal marrow may become diseased from accumulations of fluid and morbid softening. The accumulation of serum must be very considerable, and the morbid softening prevail to a great extent, in order to be either of them the cause of death. It must, however, be remembered, that the brain of the fœtus is naturally softer and much more vascular than that of the adult, which should be fully taken into consideration in the investigation of medico-legal questions bearing upon this point.

"All these diseased affections are of rare occurrence, and when they are found to be present, it is rarely to such a degree as to affect the question of infanticide. It is only when they exist in a marked form and to a considerable extent, that they can be received in explanation of the early death of the child." *Guy's Principles of Forensic Medicine*, 185.

It is children of a relatively large size, as compared with that of the pelvis, that are the most likely to perish in the birth. One general fact must here be kept in mind, and that is, that among legitimate children, according to statistical tables extending over a series of years, and embracing not less than eight millions of cases, the proportion of still-born varies from one in eighteen to one in twenty. Among illegitimate children the proportion is one in eight or ten, which is certainly a very important circumstance. *Taylor's Med. Juris.*, 382; *Guy's Principles of Forensic Medicine*, 186.

17. What are the principal points to which the attention should

be drawn, and the most approved methods to be pursued in the making of examinations in cases of alleged infanticide?

1. The attention should be directed to the body of the child. That should be weighed and measured, the position of its centre ascertained; its size should be noted, the condition of the umbilical cord, whether it be torn or cut; the dimensions of the head and thorax; every thing relating to its external appearance, shape, conformation, condition as to putrefaction, spots, ecchymosis, &c. 1 *Beck's Med. Juris.*, 418; *Guy's Principles of Forensic Medicine*, 193.

2. Any marks of violence on the surface of the body must be carefully inspected, with the view of determining, if any be present, whether they might have been produced during birth, or resulted from accidental causes acting after birth, or were inflicted by design. The mouth, fontanelles, orbits, &c., should be carefully examined for wounds inflicted by sharp pointed instruments. In order to examine the mouth, an incision may be made from the under lip to the top of the sternum, and another along the lower edge of the inferior maxillary bone; after which the integuments may be dissected back. Divide the lower jaw at its symphysis, and separate the two portions. By bending the head back, a view of the cavity of the mouth may be obtained and the position of the tongue examined. Attention should be directed to the mouth to ascertain whether any and what foreign matters are to be found in it. In this connection also the larynx and trachea should be laid open and examined, together with so much of the œsophagus as can now be seen.

3. Divide the ribs and sternum in the ordinary manner, a scissors being the more convenient instrument. After examining the configuration and size of the thorax, and laying it open, its contents should be carefully observed. The general appearance, position and color of the lungs should be noted. It should be observed whether they are of a uniform liver color and compact consistence throughout, or spongy like the adult lung, or mottled with developed air cells, as in imperfect respiration. Divide the trachea near the lungs, tie the aorta and venæ cavæ, and cut them beyond the ligature. Remove the lungs from the

thorax, and see if there are any parts of a lighter color than the rest, observing whether the structure of the lung itself is developed in those parts, and carefully distinguishing the developed air cells from air contained beneath the pleura, the result of putrefaction. The lungs should now be subjected to the static and hydrostatic tests, in the manner already directed. The heart should also be thoroughly examined, to see whether the auricles and ventricles are filled with blood, and particularly what is the state and condition of the ductus arteriosus and foramen ovale.

4. Attention may next be directed to the abdomen. To do this continue the first incision down to the lower part of the sternum, and from this point make an incision, through the integuments, to the spine of the ilium on each side. Turn down the triangular flap thus made, and examine and tie the umbilical vessels. The first thing to be observed is the diaphragm. Examine the extent of its arch towards the thorax. Observe the condition of the ductus venosus, whether it be pervious or contain blood. Tie the vessels leading to the liver, separate them beyond the ligature, take out the liver and weigh it. After having tied the two ends of the intestinal canal remove it, together with the stomach. Observe whether there be any appearance of inflammation in any part of the canal, and if so, particularly if the stomach exhibit any evidence of inflammatory action, test its contents with a view to the discovery of poison. It should be observed whether there is any evidence of the commencement of the putrefactive process. The contents of the stomach should also be examined to see whether there are in it any foreign substances, going to show that the child had been fed. The intestines should undergo a like examination to determine the presence or absence of meconium. The state of the gall bladder and urinary bladder, particularly of the latter, should be examined to see whether they are empty, or if not, how full they may be of contents.

5. As injury causing death is sometimes inflicted on the spine, it becomes necessary to direct the attention to that part. It should be ascertained whether there is any dislocation or fracture of the vertebræ. To make a more perfect examination, a

longitudinal incision should be made from the occiput to the sacrum, the muscles being separated and turned back. Divide the vertebræ on each side by means of strong scissors. Remove the posterior part of the spine, and the whole canal will be exposed for examination. 1 *Beck's Med. Juris.*, 420.

6. Attention may next be directed to the head. Make an incision from the lower part of the frontal bone, quite down to the second or third cervical vertebræ, and another at right angles to this, from ear to ear. Dissect back the integuments thus divided, and the cranium will be completely exposed. Examine the bones of the skull both at the vertex and base, to see if there be any fractures, punctures or wounds. Separate the bones by a scissors passed along their membranous connexion with each other, and then remove them. The brain and its membranes should now be examined, to see whether they are in a healthy condition, or whether there is any effusion of blood or serum. If any puncture or wound appear upon the cranium, that portion of the brain immediately beneath it must be the subject of careful examination.

7. Attention must also be directed to the suspected female, to ascertain whether she has been recently delivered, and how long, and whether the signs of delivery correspond with the appearances discovered on examination of the child. Should the result of this examination render it clear that the female is the mother of the child, it may become necessary to enquire into the state of her mind, with the view of determining whether she be, in fact, a responsible agent. It should be borne in mind, that puerperal insanity is, by no means, a rare disease, and that it sometimes takes the form of homicidal mania, theatening the life of the child. It is true, this species of insanity does not usually supervene sooner than the third day after delivery, and sometimes not for a fortnight; yet there are exceptions. 3 *Paris & Fonblanque's Med. Juris.*, 129.

An interesting case in which this question arose, is reported in 1 *H. P. C.*, 36. It occurred in 1668, at Aylesbury. "A married woman of good reputation being delivered of a child, and not having slept many nights, fell into a temporary phrenzy, and killed her infant in the absence of any company; but, company coming in, she told them she had killed her infant, and *there* it lay. She was brought to jail presently, and after some sleep she recovered her understanding, but marveled how or why she came thither. She was indicted for murder, and upon her trial, the whole matter appearing, it was left to the jury with this direction, that if it did appear that she had any use of reason when she did it, they were to find her guilty; but if they found her under a phrenzy, though by reason of her late delivery and want of sleep, they should acquit her; that had there been any occasion to move her to this fact, as to hide her shame, which is ordinarily the case of such as are delivered of bastard children, and destroy them; or if there had been jealousy of the husband that the child had been none of his; or if she had hid the infant, or denied the fact, these had been evidences that the phrenzy was counterfeit; but none of these appearing, and the honesty and virtuous deportment of the woman in her health, being known to the jury, and many circumstances of insanity appearing, the jury found her not guilty."

These are the principal points and methods to be pursued in the investigation of questions of Infanticide.

II. WOUNDS.

All the topics to be discussed under this head, can be best presented in the following order:

I. Definition. What is included under the term?

II. Division into two main classes:

   1. Those unaccompanied by solution of continuity, including all contusions, fractures, concussions, dislocations and sprains:

   2. Those accompanied by solution of continuity, including all incised, lacerated, punctured, sword and gunshot wounds.

III. Wounds as they affect the several parts and systems of the body.

IV. General medico-legal questions that may arise in the investigation of all wounds, however or whenever inflicted, including the legal principles applicable to this head.

I. *Definition. What is included under the term wound?*

This term must have a different meaning attached to it, in legal medicine, from what it has in surgery. In the latter, it is more generally understood as being confined to those organic lesions that are accompanied by solution of continuity. In the former, it is much more comprehensive, embracing every species of injury inflicted on the body by mechanical agents. 2 *Beck's Med. Juris.*, 178; *Guy's Principles of Forensic Medicine*, 446.

Some difference of opinion has arisen in relation to what is really included under the term wound, which has sometimes created embarrassment in medico-legal examinations, and even in the framing of indictments. Dr. Watson, in his work on homicide, page 18, says, that "in legal medicine, under the term *wound* is to be included every local alteration of any part of the body, produced by violent means, whether the cause has been directed against the body, or the body against the wounding cause." Hence he says, "we refer to wounds, incisions, lacerations, contusions, concussions, fractures, dislocations, sprains and burns, whether by fire or by escharotics."

This is a more comprehensive definition than is generally adopted. The law, as expounded by the English and American courts, asserts that in order to constitute a wound, the skin should always be broken or injured. It excludes burns, whether produced by heated metals or corrosive liquids, although they would seem to be included in the above definition. So, also, would the definition exclude the fracture of a bone which was unaccompanied with a solution of continuity. *Taylor's Med. Juris.*, 232.

I shall adopt the first definition given, which is that of Dr. Guy, viz., that *every species of injury inflicted on the body by mechanical means or agents, is, in a medico-legal sense, a wound.*

II. *Division:*

All wounds are to be included within one or the other of two large classes. These are,

1. Those unaccompanied by solution of continuity:

2. Those which are accompanied by solution of continuity.

First class of wounds:

Under this class are included all contusions, concussions, fractures, dislocations and sprains.

A *contusion* is a bruise of the soft parts, without cutting or laceration of the skin, caused by a blunt, hard, or firm and heavy body. *Watson on Hom.*, 21. There are various degrees of this injury. There may be simply a rupture of the capillary vessels, or a dilaceration, consisting in abrasion of the tissues, or a complete attrition or disorganization of the soft parts.

Contusions may affect, more or less, all parts of the body. They are rendered formidable by the commotion they may cause in important organs, by rupture of tissue, by inflammation, suppuration, and gangrene. *Ib.*, 22.

A contused wound is generally what in common language is termed a bruise, and in scientific, *ecchymosis.* The investigation of this form or result of a wound, becomes of peculiar importance, connected, as it very frequently is, with many nice and difficult questions of a medico-legal character.

Ecchymosis, literally meaning, to pour out, consists of an infiltration, or effusion of blood, into the cellular tissue of any part of the body. It may be of the superficial or deep-seated parts.

It is more frequently of the superficial parts, and, if very slight, no external mark is presented. When the cellular tissue under the skin is only affected, and a tumor slightly elevated is formed, it is called ecchymosis by infiltration; but when blood is accumulated in a considerable mass, forming a soft, prominent and elastic swelling, it is called ecchymosis by congestion.

The subject of ecchymosis will be best treated, by considering, 1. Its cause; 2. Its seat; 3. Its form; 4. Its history; 5. Its diagnosis; and, 6. Its production before and after death.

1. *Its cause.* By far the most common, are blows, falls, or bringing any soft part of the body suddenly and violently into contact with any hard, unyielding substance. It may, however, occasionally be referred to other causes. Narrow and oblique punctured wounds may occasion it; so, also, may certain diseased states, such as scorbutic and hæmorrhagic complaints. It may,

also, be caused by any great exertion of the body, continued for a length of time, or any violent movement, such as occurs in eaping, lifting a heavy weight, vomiting, the stretching and compression of the parts in child-birth, (*Watson on Hom.*, 23;) or any other species of effort, or movement, that is sufficiently violent, or long continued, to produce a rupture of the capillary vessels. Its presence is not, therefore, perfect evidence of the infliction of injury.

2. *Its seat:*

The seat of the ecchymosis may be stated, in general terms, to be the cellular membrane or tissue. It is not, however, confined to this, but may involve, more or less, the whole substance of the cutis. *Guy's Principles of Forensic Medicine*, 449. It may be situated immediately under the epidermis, or the blood may be infiltrated among the muscles, beneath the tendinous aponeurosis; it may be under the periosteum, between the viscera and the membrane which covers them; it may be found in the substance of the organs, between the peritoneum and the parieties of the abdomen, or between the nerves and blood-vessels, being effused into the cellular tissue which forms their sheath. In some cases, the blood which is effused is small in quantity, and the space occupied consequently small. In others, the quantity is larger, and the space occupied considerably increased. *Watson on Hom.*, 23.

It is in general superficial, affecting only the layers of the skin; but in some instances, may be found deep-seated, the blood being effused among the muscles and beneath the fasciæ. In the latter case, it will be found much more difficult to determine the extent of it from the discoloration, which will be commonly slight. *Taylor's Med. Juris.*, 239

Sometimes the ecchymosis will not show itself immediately over or around the seat of the injury, but at some distance from it. Dr. Chowne mentions a case where a young man received a severe bruise on the inner side of the ankle, the ecchymosis appearing in two days afterwards, around the outer ankle. There is also a case mentioned of a compound fracture of the tibia, about one-third down, produced by the wheel of a carriage passing over the leg, in which there was no ecchymosis around the seat of the injury, but after some days, the skin of the knee and lower part of the thigh became ecchymosed. *Taylor's Med. Juris.*, 239–40.

Where deep-seated, as under the tendinous aponeurosis of the muscles, or among the muscles themselves, there is frequently no external mark. *Watson on Hom.*, 24.

3. *Its form.* The form of the bruise or ecchymosis will depend on the shape of the weapon with which it has been inflicted; and this is a fact which may sometimes become of great importance. *Guy's Principles of Forensic Medicine*, 248, *Taylor*, 240.

In death caused by hanging, or by strangling with a cord, the ecchymosed line around the neck will generally indicate its cause with precision, as well as evidence the cause of death. So, also, where the death has been caused by strangulation by means of the hands, the ecchymosed spots caused by the application of the fingers will generally render apparent the cause of death. A very remarkable case is mentioned by Starkie, under title, circumstantial evidence, vol. 1 of his work on evidence, which goes to show the importance of attending to the form of an ecchymosis.

In an attempt at murder, the person assaulted, in his own defence struck the assassin violently in the face with the key of the house door, this being the only weapon he had near at hand. The ecchymosis which followed the blow, corresponded precisely in shape to the wards of the key, and it was chiefly through this very singular and unexpected piece of evidence, that the assassin was afterwards identified and brought to trial.

4. *Its history.* It becomes important to understand the changes that take place in the ecchymosed spot, and the order of their succession, with the view of arriving at the probable time at which the injury was inflicted. When the superficial parts are contused, especially the lax and yielding portions of the skin, the color makes its appearance at once. When the effusion is deeper seated, some days may elapse before any discoloration of the skin takes place; and if it be under the tendinous aponeuro-

sis of the muscles, or among the muscles themselves, there is frequently no external mark whatever.

When the injury has been inflicted upon the superficial parts, the color is not developed to its full extent at once, but continues to deepen for five or six hours, and sometimes longer. After a time, the serum becomes effused and inflammation supervenes, by which the extent of the ecchymosis is increased. The following are substantially the changes that occur. "In most cases the ecchymosed part at first exhibits a red or bluish color, which soon becomes livid, lead-colored, or black. This takes place from the blood situated under the skin. But as the effused blood ceases to circulate, it undergoes certain changes before it is absorbed, which cause a variation in the color of the part. In a few days the color lightens, acquires a violet tint, then becomes greenish, yellowish and finally disappears. The time of the change in color is marked by an extent of the spot, the centre of it being always of a deeper color than the circumference. These changes arise from the effused blood loosing its color, becoming brownish, coagulated, undergoing daily absorption, as also being diluted with the secretion from the cellular tissue, by which it becomes more diffused. The age, constitution, habits of life of the individual, the extent and situation of the ecchymosis, and the cause by which it has been occasioned, have a remarkable influence upon the time necessary for its complete resolution. It has been found distinct when cut into, though probably much lessened in size, several weeks after the infliction of the injury. In the case of an old man it was distinct five weeks after. *Watson on Hom.*, 234 ; *Guy*, 448 ; *Taylor*, 240. When the cellular membrane is dense, the ecchymosis is less rapidly formed, and when formed the changes occur less rapidly, than when a loose portion of it is effused."

The complete disappearance of the ecchymosis is owing to the entire absorption of the effused blood. This disappearance, as might reasonably be expected, commences at the circumference or margin of the ecchymosis, and gradually extends towards the centre. The central part of it often retains its deep blue color, after the marginal parts have completely changed their appearance. *Guy's Principles of Forensic Medicine*, 448; *Taylor's Med. Juris.*, 240.

5. *Its Diagnosis.* Under this head is included the means and methods of discriminating between real ecchymosis, and cadaverous ecchymosis or suggillation. The latter is so called from sugillatio—a black mark, and is frequently found upon the dead body, and occasionally upon the living.

In living persons, who are very aged, it is not unusual to find upon the legs and feet livid patches, sometimes mottled, and at others, possessing uniformity of color. They are owing to the languor of the capillary circulation, and are found upon those parts of the body the farthest removed from the centre of circulation, and where the blood has to contend with the law of gravity in ascending from the lower extremities. *Taylor's Med. Juris.*, 242. The age of the individual, the place where found, the absence of all abrasion of the skin, the extent, enveloping often the whole circumference of the leg, and other means of discrimination, rendered more apparent hereafter, will afford sufficient data from which, in any such case, a true judgment can be formed.

In those who have died from scurvy, typhus, and other adynamic diseases, similar discolorations are sometimes noticed. In those severely affected with scurvy, a very slight pressure on any part of the skin will produce a spot resembling ecchymosis, which arises from a rupture of minute cutaneous vessels. The extravasation, however, in such cases is the more generally wholly confined to the superficial layers of the true skin. An examination of the gums, of the surface of the skin generally, and of the mucous membranes, will, in such cases, enable any one properly to discriminate and judge. *Guy's Principles of Forensic Medicine*, 449.

Discolored spots, under certain states of the system, sometimes occur spontaneously, and often cover the body to a great extent. When small they are termed petechiæ. When extensive, they constitute the chief pathognomonic character of the disease termed purpura. In distinguishing these, especially the latter, a difficulty may sometimes exist, but the appearance of the subject, the general diffusion over the whole body, together with their existence on the mucous membrane of the fauces and alimentary canal, will, at least, indicate that their existence is not owing to violence. *Taylor's Med. Juris.*, 242 – 3.

To all these discolorations, as well as those presently to be noticed as occurring after death, the term suggillation has been applied. *Guy*, 449 ; *Taylor*, 242 – 3.

The meaning of the term—a black mark, embraces equally a real ecchymosis, as all other spots or discolorations, whether produced on the living or dead body. To remedy this, it has been proposed to confine the term suggillation simply to those appearances that are presented after death, and that make their first appearance in the dead body.

These appearances are somewhat various, differing also as to the times in which they occur. One of them may be said to be a consequence of death, but is not fully developed until the body has cooled. It is presented in the form of diffused livid, purple, or mottled patches, over the chest, neck, sides, or abdomen, and often covering the external or internal surfaces of the upper or lower extremities. These patches are commonly well defined in their extent by the whiteness of the surrounding skin. The color is confined to the upper surface of the cutis, and never extends through it. These appearances will generally be present in those who have died suddenly, or by a violent death ; as in those who perish from apoplexy or asphyxia, and they are ascribed to the congestion which takes place in the capillary system at the moment of death in subjects which are full of blood. They indicate vigor in the circulating system at the time of death, and suddenness of dissolution. There is little danger of confounding them with real ecchymosis. *Taylor's Med. Juris.*, 243 ; *Guy's Principles of Forensic Medicine*, 450.

Another appearance presented is, when the discolorations, instead of presenting in *patches*, are found distributed in *stripes*, crossing and intersecting each other over the body, and bearing some resemblance to those caused by flagellation. They have hence been termed *vibices.* They occur on different parts of the body, but the most frequently on the sides, upper part of the shoulders and back. In color they vary from a scarlet to a dark red or livid hue. It has been supposed by some that their cause is attributable to wrapping the body in a sheet or other covering soon after death, and to the accumulation of the blood in those parts of the skin which are exposed to the least degree of pressure. The sound state of the cuticle and the superficial nature of the discoloration, will generally be sufficient to enable any one to discriminate between this, and the ecchymosis which is the result of violence. *Taylor's Med. Juris.*, 243 – 4 ; *Guy's Principles of Forensic Medicine*, 450.

One other appearance still, is that observed in the dead body, and which is not to be found until some time after death. It is supposed by some to be owing to incipient putrefaction. It is usually confined to the skin covering the back, loins, buttocks, and occiput, and is caused by the infiltration of blood into the most depending parts of the body. The entire cutis becomes injected, and the adipose tissue filled with sanguineous serum. The color increases as putrefaction advances, passing from a dark red to a green, and then to black. These are distinguishable in several ways from the real ecchymosis.

1. They are found in the most depending parts of the body, being principally, if not entirely, the result of gravitation. A change in the position of the body will not unfrequently cause these appearances to change, also, disappearing from the parts that are elevated, and following those that are the most depending.

2. In these there is simply *congestion* of blood in the capillary tissue alone, not extending to the subcutaneous. The removal of a layer of the skin, where these lividities are present, will show that it is confined to this organ, and is not attended with infiltration of blood into the cellular membrane.

3. They are of a uniform color, whereas in real ecchymosis the central part is generally found to be of the deepest color.

4. In real ecchymosis, the blood, on cutting into it, will be found to be thick, concrete blood ; but in these cadaverous lividities, thin, fluid blood. This remark was made by Zacchias. *Guy's Principles of Forensic Medicine*, 449 ; *Taylor's Med. Juris.*, 245 ; 2 *Beck's Med. Juris.*, 14 – 15.

In the great majority of cases, the medical jurist will find no difficulty in determining whether the appearance presented, be a real ecchymosis or the result of causes operating towards the close of life or after death. A case, however, is given by Mr. Taylor, page 244, which shows that doubts and difficulties may occur in some extraordinary cases. A man aged 33, died suddenly of disease of the heart. He had been laboring under anasarca. The body was examined 18 hours after death, and the skin was found covered in different parts with patches of ecchymosis, some being small and others several inches in diameter, and all closely resembling ecchymoses, which are the results of violence. Around many of them was the wide border or ring of straw color, with various shades of green, similar to those witnessed in the disappearance of an ecchymosis upon the living subject, and which has generally been considered as peculiar to it. On cutting into these patches, the layers of the cutis as well as the cellular tissue beneath, were throughout reddened by congested blood. There could hardly be said to be extravasation of blood, but small rounded semi-coagulated masses oozed out from the cells on slight pressure. The border or ring of straw color, was owing to the individual having labored under anasarca, the effused serum having diluted the blood as it oozed out from the cells. These patches, it was remarked were presented on the most recumbent or depending parts. Notwithstanding their close resemblance, there were here three indications that these were cadaverous, and not real ecchymoses.

1. Their seats being the most recumbent or depending parts.
2. The skin was in a natural state and entirely unruffled.
3. The very slight extravasation of blood compared with the extent of the ecchymosed surface. This case must clearly show that there may be considerable difficulty, in some cases, in arriving at clear conclusions upon this subject.

6. *Its production before and after death.*

The resemblance which contused wounds, inflicted after death, bear to those inflicted previous to it, will depend upon their severity, and the time that has elapsed after death before their infliction. If sufficient time have elapsed to admit of vital re-action, the swelling of the part will proclaim its infliction during life, or a change of color, or other sign of inflammation, may afford conclusions equally clear. Coagula of blood may afford a remote presumption of bruises inflicted during life, but they are not positively certain in their indications, as they may be found in bruises inflicted soon after death. Fluidity of blood has been cited by some as proving the contusion to have been inflicted during life, but this cannot be relied upon, as blood effused into the brain and spinal canal is often fluid. Another means of distinguishing, and to which considerable reliance can be attached, is the *extent of the effusion.* In contused wounds which are inflicted after death, there can be very little effusion, unless some large vein be ruptured. *Guy's Principles of Forensic Medicine*, 451 – 2 ; *Taylor's Med. Juris.*, 243 – 4 ; 2 *Beck's Med. Juris.*, 16 – 17 ; *Watson on Hom.*, 24 – 5.

According to Dr. Christison, the best diagnostic mark of bruises inflicted during life, and after death, is the discoloration of the cutis, from the effusion of blood into its texture. If inflicted during life, the ecchymosed portion of cutis is dark and discolored by the infiltration of blood through its whole thickness, the skin being increased in firmness and tenacity.

Where contused wounds are inflicted soon after death, while the body still retains its warmth, and the muscles their contractility, they bear a very great resemblance to those inflicted during life. Dr. Christison made some experiments upon the recently dead, from which he arrives at the following conclusions. "For some hours after death, blows will cause appearances which, in point of color, do not differ from the effects of blows inflicted recently before death. The discoloration, like lividity or suggillation, generally arises from an effusion of the thinest possible layer of the fluid part of the blood on the outer surface of the true skin, but sometimes also, from an effusion of thin blood into a perceptible stratum of the true skin itself. Dark fluid blood may even be effused into the subcutaneous cellular tissue in the seat of the discolorations, so as to blacken or redden the membranous partitions of the adipose cells, but this last is never extensive." The general conclusion of the whole deduced by Dr. Beck is, "*that severe blows inflicted after death, will exactly imitate slight contusions inflicted during life.*" 2 *Beck's Med. Juris.*, 17. The time at which blows inflicted after death, will so nearly resemble those inflicted during life, must be limited to the lapse of two, or at most three hours after the extinction of life. If the body be allowed to become cold, and the muscles to acquire rigidity, contusions, although severe, will produce little effect.

A question may here be properly raised, whether contused wounds always produce the appearances ascribed to them; and whether, therefore, if these appearances are not to be found, the conclusion must necessarily arise that no contusion has been inflicted. This is a very important question, as it has been often asserted in courts of justice, that no severe blow could have been inflicted on a deceased person, because there was no ecchymosis to be found upon the part alleged to have been struck. The general conclusion on this subject may be stated to be—that the presence of ecchymosis may be considered as the presumptive evidence of the infliction of violence; but that its absence does not negative this presumption.

The question above suggested arose on a trial before the justiciary court of Glasgow, in the year 1837. *Taylor's Med. Juris.*, 246. A woman was found dead in her house, and her husband was accused of having murdered her. There was no mark of violence externally; but on opening the abdomen, the liver was found extensively lacerated, and there was no doubt that this was the cause of death. A medical witness asserted, that as there was no appearance of injury externally, the rupture could not have been caused by a fall or a blow. He attributed the absence of the marks of ecchymosis to the rupture having been occasioned by the forcible pressure of some heavy rounded smooth body to the abdomen. The prisoner was acquitted on a verdict of not proven.

Many instances have been collected, and may be found in Taylor, Guy and Watson, in which blows and injuries sufficiently severe to cause death, have been inflicted, and yet no mark, as evidence of their infliction, could be found externally. In one case a man, aged about thirty, having stumbled and fell on his back, a large iron pipe, for conveying Croton water, rolled on to his body. He lived about a week, and on dissection, the liver was found ruptured. There was no external ecchymosis found, but after two or three days, a yellow suffusion appeared over the abdomen, which gradually became livid.

Another was struck by a chain, which broke from violent extension, and knocked him down by a blow over the region of the liver. He ultimately recovered. There was at no time any marks of ecchymosis present. A boy was ran over by the wheel of a cart which passed directly over his abdomen. He recovered, but there was no ecchymosis or discoloration at any time. In another case the wheel of a cart, loaded with brick, passed over the chest of a boy ten years of age. He lived a few hours, and there was no external marks of violence. *Guy's Principles of Forensic Medicine*, 453 ; *Taylor's Med. Juris.*, 245–6, 7.

A laboring man died some hours after fighting with another. On inspection the peritoneum was extensively inflamed, owing to an extravasation of the contents of the jejunum, which was found ruptured to a considerable extent. There was no ecchymosis or mark on the skin externally, and the medical inspectors were inclined to affirm, contrary in this case to direct evidence, that no blow could have been struck ; but others were appealed to who at once admitted, that the laceration of the intestine might have been caused by a blow, even although there was no appearance of violence externally.

A girl, aged nine years, received a blow upon the abdomen from a stone. She immediately complained of great pain ; collapse ensued, and she died in twenty-one hours. On inspection there was no mark of injury visible externally.

A man received a kick from a horse on the abdomen. He died in thirty hours, from peritonitis. The ilium was found completely torn across in its lower third. Although the blow was here struck by the hoof of a horse, a somewhat angular or pointed body, yet there was not the slightest trace of ecchymosis externally.

A case of some interest occurred in Scotland in the year 1836, in which a woman named Finlay was indicted for the manslaughter of her husband. The deceased, during a quarrel with his wife, met with a severe compound fracture of his leg, but there was no ecchymosis whatever on any part of the limb. Five medical witnesses swore that the fracture must have been produced by a blow, and not by an accidental fall. On cross-examination, one witness said that a blow adequate to cause simple fracture, would produce ecchymosis; another, that ecchymosis seldom occurred until some hours after such an accident. Here the man lived several days and no ecchymosis appeared. Mr. Syme stated that in an open wound, when the blood was allowed to flow away, there would be no ecchymosis; a statement in general correct, although such might not be a contused wound. Other witnesses thought that ecchymosis ought to be produced by blows inflicted on any part of the body, and judging from external appearances, they should have supposed that no blows could have been inflicted on the deceased. Another said the fracture must have resulted from a fall and not from a blow. That had it resulted from a blow, he should have expected to find ecchymosis, tumefaction, and ruffling of the skin in the vicinity. That such violence as would have produced the fracture, must have caused these appearances. The prisoner was found guilty of a minor offence. It should have been borne in mind in this case, that ecchymosis may be produced by a fall as well as a blow; and, therefore, that its absence could furnish no proof whatever that the fracture had been caused by a fall.

A case is mentioned as occurring in Massachusetts in 1818, in which a small stone was thrown so as to strike the side of the head, causing death in ten minutes, and yet leaving no external mark or bruise. The cranium was very thin, the ventricles filled with coagulated blood, and the pia mater and vessels of the brain gorged with blood. Verdict manslaughter. *Guy*, 455.

A girl was accidentally struck on the back by a log of timber, and died in a few minutes afterwards. On inspection the right lobe of the liver was found torn through, and the stomach greatly lacerated. There was, notwithstanding, no trace of ecchymosis, or any mark of violence externally.

Another was struck by the seat of a car, the wheel of which was supposed to have passed over her. She was killed on the spot; but on examination there were no external indications of violence whatever, although the heart was ruptured.

In another case, a man was run over by a wagon, and survived thirty-six hours. All the ribs on the right side of the chest were found broken; the right pleura was filled with blood, the lung collapsed, and other internal injuries; and yet there were no external marks of bruise or ecchymosis, and the skin was uninjured.

The fact that the skin is possessed of great elasticity, is assigned as a reason why that may remain uninjured in these severe cases of violence; but how the vessels can escape rupture where there is a bone beneath them, is difficult to explain.

These cases should certainly admonish the medical jurist to be extremely cautious in pronouncing against the possibility of an injury where the usual external indications of it are wanting. They are all difficult of explanation, but some more so than others. For the purpose of explaining the instances in which death took place shortly after the injury, without the occurrence of ecchymosis, it has been suggested, that the individual should survive, for some hours, in order that ecchymosis should be observed in the part injured. It is certainly true, that ecchymosis is not always the immediate result of a bruise. It does not, at times, appear for six or eight hours, or until the second day, and in one instance, not until after the fourth day. Probably the superficial or deep seat of the effusion may exert some influence in reference to the time of its external manifestation. But as severe blows on the recently dead body are productive of ecchymosed appearances nearly resembling those upon the living, there should be no good reason why a blow during life should not be followed by the usual external indications developed either during life or immediately after its cessation. *Taylor's Med. Juris.*, 246.

It has also been suggested, that many of these blows were inflicted upon the abdomen, and that, in order to have the appearance of a bruise produced, it is necessary there should be comparatively hard and unyielding parts beneath the skin. *Guy's Principles of Forensic Medicine*, 452.

It will be obvious, however, that some of the cases mentioned, especially that of the girl struck on the back by a log of timber, are inconsistent with the entire correctness of this position.

A *concussion* or *commotion* is a derangement of the functions of any part or organ of the body, arising from the shock occasioned by sudden violence. It may, or may not, be accompanied with derangement of structure. In the former case, it is much more dangerous, particularly when it occurs in large and important organs, and those which are more immediately necessary to life. *Watson on Hom.*, 25.

A *fracture* is a rupture of a bone, or of a cartilage, by external violence, by a violent exertion, or a fall. Fractures are identified by a change of form, by unnatural immobility, and by a crepitation of the fractured part. Their danger depends on their situation, simplicity or complication, and on many modifying circumstances, which have also an application to all other forms of wounds. A fracture produced shortly after death, would not be likely to present any very marked characters that would distinguish it from one produced during life, but very soon after followed by death. If sufficient time after its production was allowed for the development of inflammatory action, that would afford clear evidence that it was produced during life. So, also, the occurrence of much bloody effusion would indicate the presence of life. *Guy's Principles of Forensic Medicine*, 456.

Another means of determining whether the fracture was produced prior or subsequent to death, is to examine the muscles. These are usually broken in the dead subject, at the same time with the bone, and exhibit no effusion of blood, which would almost unavoidably occur if the injury preceded death.

All the medical witness can be expected to state, in reference to a fracture, is the fact of its existence, and the kind of instrument with which it was inflicted; whether it was produced before or after death, or whether it was not caused by the use of the spade or mattock, during the process of exhumation, are points which, if he can throw any light upon, he must derive it from circumstances other than simply the inspection of the fracture.

A *dislocation* is a derangement of the position of the bony surfaces forming joints, which is the immediate result of a stroke, fall, external violence, or muscular action, accompanied with pain and alteration of form. *Watson on Hom.*, 25.

These also may be simple or compound, but the latter are much the most dangerous.

A *sprain* is an affection of the joint, occasioned by a twist or a sudden jerk, or violence; characterized by a painful swelling and difficulty of movement, and generally attended with more or less rupture of the ligaments of the joint. *Watson on Hom.*, 25–6.

Second class of wounds:

These are accompanied by solution of continuity. They include all incised, lacerated, punctured sword and gun shot wounds. Of these, the incised are of much the most frequent occurrence.

All wounds accompanied by solution of continuity, have two effects or consequences following them. The first and immediate one, is hæmorrhage; the other, and more remote, is inflammation. It is chiefly by means of one or both of these, that the medical jurist is expected to solve the problem, at times so necessary and difficult of solution, whether the wound was inflicted during life or after death.

Hæmorrhage is assumed as evidence of the existence of the circulation, at the time of its commencement, and hence as proving the fact of life when the violence was committed. 2 *Beck's Med. Juris.*, 12.

This conclusion, however, should not be received without some qualification. Blood often flows from incisions on the dead body, on altering its position, but the quantity will not be very considerable. If the large vessels are found empty, and the blood of a florid red color, it will tend to prove the wound was inflicted during life.

Lacerated wounds are attended with but very little hæmorrhage. Even where an arm has been torn off, the hæmorrhage has been observed to be very trifling.

In regard to incised wounds, recently inflicted during life, the following are their principal characteristics :

1. The edges are everted, owing principally to the vital elasticity of the skin. The cellular tissue around is also found deeply reddened by effused blood. The hæmorrhage will be abundant, and mostly of the arterial character.

2. Between the lips of the wound, if it have not been interfered with, there will be found coagula of blood. Blood that has fallen upon surrounding bodies, will also be found coagulated.

3. If sufficient time have elapsed after the infliction of the wound, say from eighteen to twenty-four hours, and life have continued during that time, there will be found present the usual signs of inflammation, viz., increased redness, swelling, and effusion of coagulable lymph. *Guy's Principles of Forensic Medicine*, 456 – 7 ; *Taylor's Medical Jurisprudence*, 237.

If incised wounds be inflicted upon the body some twelve or more hours after death, their characteristics will be as follows :

1. The edges, instead of being everted, are in close proximity, and are soft, yielding, and destitute of elasticity. The cellular tissue around, is either not at all infiltrated with blood, or to a very limited extent. There is usually little or no bloody effusion, but whatever there is, is venous, proceeding from a divided vein.

2. The blood is fluid. As it falls on surrounding bodies, it forms no coagula. Neither are there any coagula between the lips of the wound.

3. There are, of course, no signs of inflammatory action. *Guy's Principles of Forensic Medicine*, 457 – 8.

The difficulty, here, as in ecchymosis, consists in discriminating where the wound is inflicted soon after death, and while the body is still warm. Mr. Taylor has given the results of several experiments made by him upon limbs recently amputated. See *Taylor*, 238. In one case, an incision, three inches in length, was made in the calf of the leg, two minutes after its amputation. The skin retracted considerably, causing a protrusion of the adipose substance beneath. But little blood escaped, owing, apparently, to the sudden protrusion forwards of the cellular membrane, mechanically preventing its exit. After the lapse of twenty-four hours, the edges were found red, bloody and everted; the skin not in the least degree tumefied, but merely a little flaccid. On separating the edges, a small quantity of fluid blood escaped, but no coagula were seen adhering to the muscles. At the bottom of the wound, in close contact with the fasciæ, was a small quantity of coagulated blood; but the coagula were so loose, as readily to break down under the finger.

In another experiment, an incision of the same dimensions was made on the other side of the leg, penetrating through the peronei and into the flexor longus pollicis of the deep-seated layer of muscles, ten minutes after its separation from the body. In this case, scarcely any blood escaped, and the edges of the wound became but slightly everted, the skin appearing to have lost its elasticity. Twenty-four hours afterwards, the edges of the incision were pale, and perfectly collapsed, presenting none of the characters of a wound inflicted during life. At the bottom of the wound, and enclosed by the divided muscular fibres, there were some coagula of blood, but fewer than in the other experiments. A portion of liquid blood had escaped, owing to the leg having been moved.

Other experiments were made after a longer period of time had elapsed, and the appearances were less distinctly marked. If the incision was not made until two or three hours after the removal of the limb, although a small quantity of liquid blood was effused, no coagula were found.

When the medical witness has an opportunity of examining the body previous to its removal and being washed, the quantity of blood lost by hæmorrhage should be a special object of attention. If the wound be the cause of death, whether immediate or after the lapse of some period of time, and that death arises from exhaustion, the quantity of blood effused will be very great, and the large vessels found comparatively empty; whereas if the wound be inflicted soon after death, and while the body is still warm, the quantity will be small, unless the weapon happens to cut a large vein, in which case the cause of the greater effusion may be attributed to that circumstance. It is not always, however, that death from hæmorrhage occurs in consequence of exhaustion. It may arise from the effused blood being confined, so as mechanically to compress and impede the functions of some of those organs which are immediately necessary to life. There may be, for instance, an effusion of blood within the cranium, compressing the brain, within the spinal canal, into the pericardium or within the substance of the lungs; all which may produce death without any great quantity of hæmorrhage. But in such cases it will be apparent from the locality of the hæmorrhage.

A question in relation to the time of the infliction of a wound arose in the case of Greenacre, tried in 1837, for the murder and mutilation of a female. *Taylor's Medical Jurisprudence*, 238–9. The head was found severed from the body, and the question was, whether the severance took place during life or after death. The medical evidence went to show that the head was severed from the body while the female was alive, but probably after she had been rendered insensible by a blow on the head, the marks of which were visible. This evidence was founded on two circumstances.

1. The muscles of the neck were found retracted, and

2d. The head was completely drained of its blood. The last furnished a strong inference; for, although the severing of the head from the body after death, will be attended with some effusion from the jugular veins, yet the quantity will not be sufficient materially to affect the contents of the cerebral vessels.

In connection with the subject of hæmorrhage, some attention should be bestowed upon the means of identifying spots of blood found on the body itself, on the soil, furniture or clothes, or on the instrument with which death has been inflicted.

There is no direct chemical process by which blood can be identified. This renders it necessary, in cases of doubt and difficulty, to resort to the physical character and appearances, and also the action of chemical agents.

A small quantity of blood forms, on the surface of steel, a transparent red spot ; a greater quantity a deep reddish brown crust. The crust scales off under a moderate heat, leaving a clean surface beneath. On placing it within a tube, and subjecting it to a high temperature, ammonia is given of, which will be rendered evident by its re-action on test-paper. *Guy's Principles of Forensic Med.*, 458.

We are indebted principally to the French medical jurists for our knowledge of what light chemistry can throw over this subject.

In relation to steel instruments there are two kinds of spots resembling those of blood. These are

1. Spots of lemon juice. The agent here is the citric acid. When the lemon juice is not wiped off the acid produces thin spots of a reddish yellow color, the thicker being of a reddish brown, nearly resembling those of blood. They separate, like blood spots, on the application of a moderate heat. Subjected to heat, a volatile matter is thrown off, having an acid re-action, while that from blood has an alkaline. Both are soluble in distilled water, but the solution from the former is a light yellow ; that from the latter, red. That from the former has an acid re-action ; from the latter, neutral. Infusion of galls with the former yields a black precipitate ; with the latter, a red.

2. *Spots of rust.* These are sometimes mistaken for blood. They resemble the lemon juice spots in color, but, unlike those, or spots of blood, they will not scale off on the application of heat. They resemble blood spots in giving off a sufficient quantity of ammonia, to have an alkaline re-action on test-paper, when subjected to heat in a glass tube.

The blood spot is dissolved by maceration in water, while the rust spot is merely detached, and is capable of being completely separated by filtration, so as to leave the water quite clear, and unaffected by the tests of iron. Muriatic acid dissolves iron rust, leaving the metal clean ; the solution affording evidence of the existence of iron when subjected to the appropriate tests. The same effect is produced by the same agent on the lemon juice spot, but the blood spot is not removed, nor is the resulting solution affected by the tests for iron. If the instrument, having bloody spots upon it, has been long exposed to the air, spots of rust will be mixed with those of blood, and will be partially detached by maceration in water. They can, in such case, be readily separated by filtration.

Another difficulty may present itself in determining whether appearances resembling spots of blood on clothes, are really owing to blood or to madder, or some other coloring matter. It has been objected that a mixture of madder and albumen, possesses all the characters assigned to blood. Mr. Taylor asserts that mixtures of serum or albumen with cochineal, lac and madder, can in no respect, except in color, be confounded with blood; that they can deceive no one who does not trust to the red color alone. *Taylor's Med. Juris.*, 271 – 2.

The piece of linen or other stuff, on which the red spot is found, must be cut out and macerated in distilled water. "If the spot is of any thickness, the albumen or coloring matter, will separate and sink to the bottom of the liquid, while the fibrin adheres to the surface in the form of a white filamentary mass. If attempts have been made to remove the stain, or if it has been formed merely by contact with another stain, no fibrin will be found attached to the cloth." *Guy's Med. Juris.*, 459.

The application of acids changes the color of madder to yellow, and that of alkalies to violet. A drop of the acetic acid will have this effect, but the blood spot will remain unaltered by it at a low temperature, and acquires a deep brownish hue by boiling.

The coloring matter of blood in solution, remains unaltered on the addition of ammonia, and the albuminous part of the blood will be detected on boiling, or on the addition of a mineral acid. On macerating stains of blood and red dyes in water, the former are dissolved, while the latter remain unaffected. *Guy's Principles of Forensic Medicine*, 460. Simple maceration in cold water is the most effectual to remove a blood stain, but the process of removal is sometimes slow. *Taylor's Med. Juris.*, 273.

Iron moulds on linen have sometimes been mistaken for stains of blood. The distinction is easily made. The coloring matter of blood is discharged by water. That of iron is not. Muriatic acid dissolves out the iron, which may be discovered by its characteristics. *Guy's Principles of Forensic Medicine*, 460.

It has been made a question, if it be possible to tell from a blood stain, whether it be the blood of a man, or of some animal. As the difference in the microscopic character is not sufficiently appreciable, except by the most experienced, and then must fail, unless the spots had been entirely undisturbed; it has been proposed to adopt Barruel's aromatic test, and to attempt distinguishing by the characteristic odor given off on adding to the blood strong sulphuric acid. In the male, he finds the odor of perspiration; in the female the same, but in a less degree. In the horse, that of horse dung; and so also with sheep, the ox, dog, &c. *Taylor's Med. Juris.*, 275; 2 *Beck's Med. Juris.*, 92-3.

It is now very generally conceded that this test, and these means of distinguishing, are altogether too uncertain to be relied upon in judicial proceedings.

The remote effect, or consequence, resulting from wounds of the second class, is inflammation. This is rendered evident principally by the presence in the part of pain, preternatural heat and swelling. The fact of inflammation, resulting, as it does, from living reaction, is of course evidence that the wound was inflicted during life.

Lacerated wounds combine, to a considerable extent, the characters both of incised and contused wounds. They are accompanied with less hæmorrhage than the incised, and with some of the discoloration of the contused. They are more generally the result of accident than design, and not unfrequently indicate, by their appearance, the means by which they were produced.

Punctured wounds occupy an intermediate space between incised and lacerated wounds. When inflicted with a sharp instrument, and attended by profuse hæmorrhage, they resemble the former; but when caused by a blunt instrument, and accompanied by slight effusion of blood, they are more like the latter. They are not unfrequently more dangerous than incised wounds, because they penetrate deeper, and divide imperfectly the nervous filaments and aponeurotic parts, affording a less free egress to matter effused from them.

The considerations connected with *sword* and *gun-shot* wounds are reserved to the fourth general topic, or that of medico-legal questions.

III. Wounds as they affect the several parts and systems of the body.

This may be made the subject of very extended remark, and, even with a consistent degree of brevity, will claim considerable consideration.

1. Wounds of the head, injuries of the brain, spinal cord and nervous system. These should be considered, because they are of frequent occurrence; and either cause death or produce effects dangerous to life; and are often the subjects of medico-legal examination.

Wounds of the head may either injure the integuments, fracture the cranial bones, or penetrate into and injure the substance of the brain. An injury to the integuments may be followed by an erysipelatous inflammation, or by inflammation of the occipito-frontalis tendon. The danger is less from incised wounds than from punctured and contused, as punctures may injure the tendon, and contusions disorganize the texture of the skin. A contused wound, if accompanied with much laceration of the integuments, is always dangerous on account of the tendency to erysipelatous inflammation.

The same remark applies to wounds of the integumentary parts as to all other parts of the head, viz: that all prognosis in reference to them must be extremely uncertain. Those which apparently inflict but a slight injury, may be attended with fatal results, while those which seem much more severe, often turn out perfectly harmless.

Simple fractures of the cranial bones, which are attended with no injury to the membranes, are not usually followed by any dangerous consequences. A blow sufficient to cause a fracture, may also produce concussion or other injury of the brain. It is important to notice that the injured part of the bone may feel depressed, from the fact that the outer table may be driven into the diplœ, while the inner one and the brain remain uninjured. The brain, in such a case, is less liable to suffer from concussion, as the force of the blow is expended upon the fracture.

It is also important to notice, that the fracture is not always found in that part of the skull on which the blow was inflicted. The skull having the form of an arch, a blow upon one part of it, is not unlikely to produce the fracture at the part directly opposite. Hence, a blow on the vertex, will often occasion a fracture at the base of the skull; and that more particularly when the force is applied at once to a large surface.

Fractures at the base, occurring before re-action of the occiput upon the atlas, occasioned by violence applied at the top of the head, or in whatever other way produced, are more dangerous than fractures of any other part, for the reason that they are very generally accompanied with a laceration of the brain at its base, or an effusion of blood which compresses it at this vital part, where many of the nerves take their rise. *Watson on Hom.*, 58.

In such cases, bleeding from the ears is often observed, which is attributable to injury of the lateral sinuses.

Fractures of the skull are often found to be greatly disproportioned to the amount of force used. The same degree of force will cause different extents of fracture when applied to different parts. This is caused principally by the varying thickness of the skull. A blow on the temple, for example, would produce much greater injury than one of equal force applied to other parts of the cranium. So, also, the orbitar plate offers another point easily injured; and the cribriform plate of the ethmoid bone is fractured by a smaller amount of force than any other parts.

The brain itself may receive injury from three prominent causes. These are, concussion, compression, and inflammation.

1. *Concussion.* This may arise from a severe blow or a violent shock. When it is violent, the symptoms follow immediately, death occurring without re-action. There are several instances of death from this cause, where no lesion of the brain could be discovered; where there was even no fracture, no effusion, or any lesion to be found on dissection. This is more likely

to happen where death is the immediate result of the injury. A shock is given to the "whole nervous organ, which, being unrelieved, speedily lapses into annihilation of function."

"A prize fighter was taken off the ground insensible, and apparently apoplectic, and died in eight hours. No lesion or extravasation could be discovered on careful inspection of the brain."

Blows on the head with the fist may cause concussion, and are not unfrequently made medico-legal subjects of inquiry. In such cases, the person on whom the injury is inflicted, is generally knocked down, and falls upon the ground with some degree of violence. It may hence be doubtful whether the blow, or the fall, caused the concussion. In such cases, if there is effused blood within the cranium, an indication may be drawn from the place where it is found. It will be found opposite to, and corresponding with, the external mark of injury, whether resulting from the blow or fall. In such cases, however, the culpability of the assailant is generally the same.

Where concussion is not the immediate cause of death, it may ultimately produce it from an effusion of blood occurring from the ruptured vessels, or from inflammatory effusion or softening of the brain. In such cases, no immediate inconvenience may arise from the injury; but after the lapse of some days, or even weeks, symptoms of compression or inflammation of the brain may supervene, which may result in death after intervals of days, weeks, months, or even years. Hoffbauer mentions a case where a death from concussion took place eleven years after the receipt of the injury. In the case mentioned by Mr. Potts, the woman who received the injury on the head remained well for twelve days. She then fell ill, and died with symptoms of compression of the brain. The ventricles were found to contain bloody serum, and a small coagulum of blood. A girl fell from a swing, striking her head violently against the ground. She complained of headache for six weeks after; then came feverish symptoms, followed by slight delirium and coma. She died in two months after the fall. The ventricles were found distended with serous fluid, but no other morbid appearances presented. In cases of chronic inflammation following concussion, the person may suffer from pain in the head and vomiting. *Guy's Principles of Forensic Medicine*, 482–3; *Taylor's Med. Juris.*, 304; *Watson on Hom.*, 46–7.

The most prominent symptoms of concussion are, immediate stunning and insensibility, accompanied with headache, a small, weak and irregular pulse; as also coldness of the extremities and surface of the body; sometimes attended with delirium, at others with syncope and convulsions. There appears to be a depression of the vital powers by which the blood is circulated, which occasions syncope and death. Simple concussion is distinguished from compression and inflammation, by the weakness and irregularity of the pulse, vomiting and coldness, which accompanies the insensibility in the former; while in compression, there is a full, strong, and often irregular pulse, natural heat of the body, relaxation of the muscles, dilatation of the pupils, stertorous breathing, and paralysis. *Watson on Hom.*, 31–34.

2. *Compression.* This may result from concussion, in either of two ways:

1. By a portion of the bone becoming depressed into the brain: or,

2. By an effusion of blood or serum into its substance. When produced by the cause first mentioned, and death follows, there is usually no difficulty, as the cause will be clearly revealed on post-mortem examination. When death follows compression, resulting from the second cause, it is very possible to urge that the effusion of blood or serum is due to some condition of the system, or to some cause other than the injury. *Guy*, 483.

The conditions of the system favorable to effusion are, habits of intoxication, a plethoric habit, an apoplectic make, advanced age, intense excitement arising out of a contest; and more especially, a diseased state of the vessels of the brain. These will come more especially to be considered, when we investigate the question of the cause of death.

Compression from either of the causes enumerated, is attended with the same symptoms. These consist of insensibility, coma, so deep that the sufferer cannot be aroused from it, palsy, slow but otherwise natural pulse, stertorous breathing, dilated pupils. These are sometimes followed by sudden death; but more commonly, death does not take place until after the lapse of one, two, or several days. *Watson on Hom.*, 58.

The effect of the concussion, by depressing the state of the circulation, will produce, at first, a slow effusion of blood from the ruptured vessels. When re-action takes place, the quantity of effused blood becomes greater. *Ib.*, 52.

The points to be noted, in cases where death results from compression caused by effusion, are, the age and habits of the deceased, the condition of his system, whether plethoric or otherwise, his make, his state of excitement at the time, the healthy or diseased condition of the vessels of the brain, and the relation which the effusion bears to the external injury. In reference to the latter point, it may be remarked here, that the principle formerly brought to view in the case of fractures, is again disclosed in the case of injuries to the brain, viz., that the injury is not always found under the spot where the blow was inflicted, but often, by counter-stroke, on the surface of the brain directly opposite.

3. *Inflammation.* Inflammation and its consequences are likely to follow, when injuries to the brain are not immediately fatal. They may follow slight injuries as well as severe; and those, not only of the organ itself, but also of its common integuments. The time, after the injury, at which the inflammation occurs, is exceedingly various. It sometimes sets in after one or two days; in others, after one or two weeks; in others still, it proceeds for several months, insidiously, without affording distinct indications of its existence, until near the approach of a fatal termination. In general, it does not supervene until one week after the accident, nor can the person injured be considered out of danger until two or three weeks after the injury. *Watson on Hom.*, 61 – 2; *Guy's Principles of Forensic Medicine*, 484.

A case is given in Watson on Homicide, 63, which may illustrate the principle of the supervention of inflammation:

J. Kerr, aged 22, was struck on the forehead with a hoe, causing a compound, comminuted and depressed fracture of the skull. On the day after receiving the injury, Kerr was brought to the Royal Infirmary. He walked up stairs to his bed, and did not seem very ill. Symptoms of inflammation came on, and he died seven days after the injury. On dissection, there was inflammation of the membranes, and an abscess in the substance of the brain, below the seat of the injury.

The symptoms indicating inflammation either of the brain or its membranes, are, fever, pain of head, flushing of face, delirium, quick and sharp pulse; and when the inflammation has advanced to the effusion of lymph, or suppuration, these symptoms are followed by rigor, convulsions, stupor, insensibility, coma and death. *Watson on Hom.*, 62.

It should be remarked, that injuries of the head may at first appear of very little consequence; but, after a considerable interval, dangerous symptoms may arise, and prove fatal. *Guy's Principles of Forensic Medicine*, 484.

Injuries to the spinal cord are not of such frequent occurrence as to become often the subjects of medico-legal investigation, as this part is extremely well protected from external violence. The medulla oblongata may be wounded, or compressed by bloody effusion, or by fracture and dislocation of the vertebræ, and instant death caused in consequence of the suspension of the circulation and respiration. The penetration of this part with a very small instrument speedily occasions death. An effusion of blood at the base of the cranium, may compress this part, and thus quickly occasion death.

Injuries to the spinal cord will vary in their effects according to the degree of violence used, and the part of the spine which has been wounded. When deeply penetrated, or severely injured, at its upper part, death takes place immediately. Such a result may be anticipated, when the wound is above the third cervical vertebræ. If the neck is bent forward, a fatal wound may be very easily inflicted here, and yet leave but a trifling external mark of injury.

Injuries to the spinal cord may arise from falls or blows, the most commonly inflicted on the head or lower part of the spinal column. Injuries inflicted upon the middle or lower portion of the spinal cord, are attended with a loss of power and sensation in the parts below the seat of the injury, and also with a disturbance of the functions of the viscera, which sooner or later proves fatal. Injuries which produce neither fracture nor dislocation, may occasion death by causing inflammation and softening of the spinal cord. *Guy's Principles of Forensic Medicine*, 484; *Watson on Hom.*, 68 – 9; *Taylor's Med. Juris.*, 313 – 14.

Wounds of the face. Injuries to the face may produce deformity, and thus result in a damage much greater than the injury actually experienced. This is the most likely to occur when the wound is deep-seated. The distribution of important nerves over the face creates a source of danger to be apprehended from wounds there, which does not exist in many other parts of the body. There is also much danger resulting from the near proximity of the principal features to the brain. In several instances, trials for murder have taken place, in which the death has been caused by a penetrating wound of the orbit, fracturing the orbitar plate, and injuring that organ. It is not even absolutely necessary that the orbitar plate should be fractured or perforated; but a severe injury there, unattended with fracture or perforation, has caused a fatal inflammation of the brain. *Guy's Principles of Forensic Medicine*, 484 – 5; *Taylor's Med. Juris.*, 311.

Wounds of the throat and neck may become subjects of medicolegal enquiry. The infliction of these, is a mode of death selected by many suicides. The murderer sometimes inflicts them, in the hope that they may be attributed to suicide. Wounds on the side of the neck are generally less dangerous than those on the anterior part of the throat. The danger to be apprehended is derived from two sources, viz., the position of the wound and the parts that are injured by it. Wounds inflicted on the lower part of the throat are less dangerous than those of the upper part. A section of the carotid artery is almost invariably fatal, and that almost instantaneously, from the excessive hæmorrhage. There are one or two rare cases on record, where immediate and continued pressure has succeeded in stopping the hæmorrhage sufficient to save life. A division of the internal jugular vein is about on the same footing as that of the carotid artery.

Wounds of the pharynx and œsophagus are dangerous for two reasons; one is, that the nourishment of the system must be carried on through them, and deglutition, by the motion it renders necessary, is opposed to an adhesion of the parts; the other is, that other important parts are generally injured along with them. A wound of the larynx is likely to have an injurious effect on the voice, deranging or weakening it. The trachea may be partially divided, without being attended with much danger. There is always a difficulty in its healing, from the opposition resulting from its unquiet state to any re-union of the parts. A complete division of it is generally mortal. *Guy's Prin. of Foren. Med.*, 485-6; 2 *Beck's Med. Juris.*, 206, 7, 8.

Wounds of the chest or thorax may be either contused or incised. The danger in case of the former is generally in a ratio to the degree of violence used. Injuries of this kind may prove fatal either, 1. From syncopal asphyxia, or the depression of the constitution resulting from the shock; or, 2. From the inflammation and fever occasioned by the violence. Injuries of this description are very generally accompanied by fractures of the ribs or sternum; or by a rupture of some of the viscera within the cavity; by a profuse hæmorrhage; or by subsequent inflammation of the organs. The danger resulting from fracture of the ribs, will depend very much upon whether they are splintered by the fracture, and the points driven inwards, so that they are not reducible. In such a case there is usually a fatal termination. A greater degree of violence is required to fracture the upper ribs than the lower, and hence more danger is to be apprehended from fractures of the former than the latter. Fracture of the sternum may be accompanied with such a degree of concussion as to disturb the internal organs, or the bone may be depressed as well as fractured; in which case great danger is to be apprehended from injuries done to the viscera behind it. Otherwise the fracture of this bone may not be considered as dangerous. *Taylor's Med. Juris.*, 314-15; *Watson on Hom.*, 179; 2 *Beck's Med. Juris.*, 209.

The danger resulting from incised wounds will depend upon the direction taken by the weapon or instrument inflicting them, and the consequent injury done to the contained viscera. The chances are, that the lungs or heart will be injured, and that the rupture of some blood vessel may give rise to internal hæmorrhage, which will be likely to have a fatal termination.

The lungs are subject to concussion termed *wind concussion*, which is usually fatal. Incised wounds of the lungs are attended with a degree of hæmorrhage depending upon the size and importance of the ruptured blood vessel. As the great mass of the blood circulates through the pulmonary vessels for the purpose of oxygenation, it will be readily perceived, that the rupture of one of those vessels, especially if it be one of the larger trunks, will cause the individual very speedily to sink. The quantity of blood escaping from the wound, is here no criterion of the extent of the injury. It may be also discharged by expectoration, or it may accumulate in the cavity of the pleura, until it excludes the respiratory process. One of the criteria by which a wound of the lungs may be known, is the frothiness and florid color of the blood which issues from the orifice or is expectorated. The expectoration of it is also another indication. An injury to the substance of the lung is not necessarily fatal. Portions of lung have been entirely removed, and a recovery, nevertheless, taken place; and a bullet enclosed in a cyst has remained in the substance of the lung for years. *Guy's Principles of Forensic Medicine*, 487; *Taylor's Med. Juris.*, 315; 2 *Beck's Med. Juris.*, 209–10.

The heart is also liable to be injured by a penetrating wound in the thorax. All wounds of this organ were formerly considered as necessarily mortal, and that too with very little delay. A more widely extended knowledge, however, has settled the point, that they are not necessarily immediately fatal. Some even appear to be not necessarily mortal. The manner of occasioning death is almost invariably by hæmorrhage. The rapidity and extent of this will depend very much upon the position and circumstances attending the wound. Wounds of the base are less speedily fatal than those of the apex; superficial, less so than those which penetrate the cavities. Wounds which are parallel to the axis of the heart are less rapidly fatal than those which are transverse to it. Wounds of the ventricles are less rapidly fatal than those of the auricles. A weapon may pass so obliquely through the parieties, that the flap may act like a valve; or the presence of the weapon in the wound, may mechanically obstruct the effusion of blood; and thus in each case, the fatal result will be retarded.

All these circumstances render the time very uncertain at which death occurs. In one case, a soldier had the apex of the heart cut with a long and slender sword, and survived twelve hours; the heart, at every stroke, losing a small quantity of blood, till, at the expiration of that time, there was a sufficient quantity entirely to fill the chest, and he died of suffocation. In another case, the point of the sword cut the coronary artery, which threw out its blood so slowly, that two hours elapsed before the pericardium filled with blood, when, after great anxiety, he died. There have been instances of recovery from wounds of the heart, but they are very rare, and generally under peculiar circumstances. *Taylor's Med. Juris.*, 315–16; *Guy's Principles of Forensic Medicine*, 487–8; 2 *Beck's Med. Juris.*, 210–11.

Wounds of the large arteries and veins around the heart are necessarily mortal. Wounds of the thoracic duct are mortal from the extravasation of its contents. Those of the œsophagus would be likely to be so, as the passage of food would be prevented, and the function of nutrition impeded or destroyed

The diaphragm may be wounded by a weapon penetrating either the thorax or abdomen; but it is seldom injured by any weapon without an injury occurring also to some of the important organs that are in contact with it.

A puncture of the diaphragm alone is not necessarily attended with fatal consequences, although it may be fatal in its ultimate results, as it is sometimes followed by hernia of the stomach. The most serious wounds of the diaphragm are those produced by violent contusions. A severe blow or fall may rupture it, and this will occur the most readily while the stomach and viscera are distended. In such cases the muscular fibres are generally found ruptured. The death may occur immediately from a fatal shock to the nervous system. It may also occur after a considerable interval, from a protrusion of the viscera of the abdomen into the chest, thus disturbing the functions of the organs contained in those cavities. *Guy's Principles of Forensic Medicine*, 488–9; *Taylor's Med. Juris.*, 318–19.

Wounds of the abdomen may arise either from contusion or incision. Contused wounds of the abdomen are generally more dangerous than those of the thorax, as the abdominal parieties have less power to resist external shocks. Incised and punctured wounds, without even penetrating the cavity, may prove fatal by wounding the epigastric artery. Their danger, however, usually arises from touching the peritoneum, or injuring one or more of the viscera contained in the abdomen. In the latter case particularly, very difficult medico-legal questions may arise.

Wounds in the region of the abdomen may prove dangerous in a variety of ways as,

1. By the shock made upon the nervous system.
2. By the hæmorrhage which results from them.
3. By subsequently occurring inflammation.
4. By preventing the nutrition of the body, or other consequences remote from the time of the injury.

Severe and even slight blows on the region of the stomach may produce death immediately, without any lesion of the internal organs, or subsequent inflammation. "A man walking through Fleet-street, happened to quarrel with a woman, when another came up and gave him a blow in the region of the stomach, which caused almost instantaneous death. On dissection, no cause could be found to account for his sudden death." Dr. Holland maintains that in such a case, the fatal result is attributable to the sudden propulsion of arterial blood into the left ventricle; this retrograde movement so overpowering the action of the heart as to cause death. By others it has been generally ascribed to the shock transmitted to the system, through a violent impression produced on the solar plexus.

There are also other instances, where the internal organs, as the stomach, intestines, gall bladder, or urinary organs are perforated, and their contents become extravasated into the peritoneal cavity. In such cases, such intense pain is immediately occasioned, that, before inflammation begins, and without hæmorrhage, the powers of the nervous system become depressed, and death occurs by the failure of the action of the heart.

There are also instances where blows, and other injuries of the abdomen, have proved fatal by inducing inflammation, although the internal organs are not injured. A death was caused by blows inflicted on the abdomen with fists, and a kick on the right groin; and on dissection, the peritoneum was found much inflamed, and covered with purulent effusion.

There are also other instances where, from a rupture of the intestinal canal, or other viscera of the abdomen, an effusion of foreign matter takes place into the peritoneal cavity, causing violent inflammation, and attended with so great a depression of the nervous energy, that death very soon follows. In such cases there is a feeble pulse, feeling of depression, exhausted look, coldness of the surface and extremities, and collapsed appearance, indicating great depression of the action of the heart through the medium of the nervous system. It should be constantly kept in view, that a rupture of some part of the bowels may occur spontaneously, and that even without previous disease.

Penetrating wounds of the abdomen are not always fatal; and even wounds of the stomach are not necessarily so, many cases of recovery being recorded, when the wound was extensive, and the stomach, at the time, distended with food. *Watson on Hom.* 183, *et seq*; *Guy's Principles of Forensic Medicine*, 489; *Taylor's Med. Juris.*, 319 – 20; 2 *Beck's Med. Juris.*, 213 – 14.

Wounds of the intestines, may prove injurious in many of the ways already mentioned; more generally, however, by hæmorrhage, effusion of contents, and inflammation. They are by no means necessarily fatal, and in the absence of extravasation, there is a fair chance of recovery, as coagulable lymph easily becomes effused and organized about the edges of the incision. Wounds of the smaller intestines are more dangerous than those of the large, as they are supplied with a greater number of nerves, have more important functions confided to them, and there is much more danger of extravasation of their contents, being in a more fluid state. So also wounds of the duodenum are more dangerous than those of the other small intestines. *Guy's Principles of Forensic Medicine*, 490; 2 *Beck's Med. Juris.*, 216.

Wounds of the liver may occur from rupture, or from penetrating instruments. The former may be occasioned by blows or falls; or it may happen, (as occurred to an individual who was endeavoring to avoid a fall from his horse,) merely by a very sudden action of the abdominal muscles.

The rupture generally appears on the convex surface, running from before backwards with a small obliquity, the lacerated edges slightly separated, and the surfaces presenting a granular appearance. Ruptures are generally more certainly fatal than penetrating wounds. The latter, if extending to any depth, may prove fatal by dividing some of the large vessels. In other cases, danger may arise from inflammation of the organ. *Guy's Principles of Forensic Medicine*, 489; *Taylor's Med. Juris.*, 320–21.

Wounds of the gall bladder are generally fatal, owing to the extravasation of bile inducing peritonitis.

Wounds of the spleen are very similar to those of the liver. When deep, they usually prove fatal from hæmorrhage. When superficial, they usually admit of recovery. *Guy's Principles of Forensic Medicine*, 489; 2 *Beck's Med. Juris.*, 218.

Wounds of the kidneys are the most likely to arise from blows and stabs in the loins. The dangers to be apprehended from penetrating wounds, are hæmorrhage, extravasation of urine, and inflammation. Wounds of these organs are not necessarily fatal, and there are many chances of recovery, provided the effusion of urine into the peritoneal cavity can be prevented. *Guy's Prin. of For. Med.*, 490–2; 2 *Beck's Med. Juris.*, 218.

Wounds of the bladder are the most likely to occur as the result of blows on the lower part of the abdomen. Rupture may also be caused by an accidental fall. The part of it most subject to rupture is the upper and posterior, where the organ is covered by the peritoneum. The general effect is, that the urine becomes extravasated, and death takes place as the result of peritoneal inflammation. The time at which the fatal termination occurs, is usually from three to seven days, occasionally longer. One fact to be specially noticed is, that a rupture may be caused by a blow so severe in its consequences as to produce death, and yet no mark of ecchymosis or injury to the skin be visible. This furnishes a very plausible defence, and should certainly lead to a more thorough examination of the part, to determine whether some diseased condition may not have led to a spontaneous rupture. The medical jurist must, however, be aware, that, owing to the yielding and elastic nature of the parieties, ruptures of the viscera of the abdomen from violence, may take place without such ecchymosis or marks of injury. Spontaneous eruption may be very reasonably expected to occur, where a paralysis deprives of the power to expel the urine, or where the bladder is diseased, or some obstruction exists in the urethra. A blow will seldom, if ever, produce rupture of the bladder, unless it be distended with urine, which is at times its natural condition. The pressure of the child's head during parturition, may occasion rupture of the bladder. This, in England, has furnished the occasion for a case of mal-practice. The danger may be avoided by the use of the catheter. Ruptures of the bladder are commonly attended with intense pain, sickness, and prostration of strength. The cavity of the pelvis is very frequently the recipient of extravasated blood, or other fluids, that may escape in consequence of wounds, or other injuries, to the abdominal viscera. *Taylor's Med. Juris.*, 322, *et seq*; *Guy's Principles of Forensic Medicine*, 490.

Wounds of the genitals may be dangerous from the profuse hæmorrhage that sometimes follows. But for the danger arising from this cause, the penis, and even the entire male genitals, may be removed, without being followed by a fatal result. They have in many instances been so, and yet a complete recovery taken place. There have been instances where lunatics and idiots have removed them, and in some cases others, as in the case of Origen, from conscientious motives; and yet have survived, although the hæmorrhage may have been quite profuse.

The entire removal of the testicles appears to be less dangerous than a severe contusion or bruising them, which may prove fatal by the shock communicated to the nervous system. Deep wounds of the labia of the female are dangerous from hæmorrhage. *Taylor's Med. Juris.*, 224; 2 *Beck's Med. Juris.*, 220.

Wounds of the extremities are not generally to be considered as dangerous. When only the integuments, and the first layer of muscular fibres are wounded, they will heal without difficulty. Injuries inflicted on the tendons, are generally very slow in healing, and can often be only imperfectly healed. Compound fractures are sometimes hazardous, and comminuted, extremely tedious in curing. All fractures are much more easily healed in young than in old persons. 2 *Beck's Med. Juris.*, 221. Equal degrees of force will more readily produce fractures in the old than in the young, and in the young rather than in the adult. There are also certain diseases, such as syphilis, arthritis, cancer, scurvy, and rachitis, that render the bones fragile, and much more liable to fracture from the same degree of force. Successful defences have sometimes been sustained upon this abnormal condition of the bones. Some bones, such as the olecranon, os calcis and patella, have at times been fractured by violent muscular exertion alone, but this can seldom happen to the long bones. *Taylor's Med. Juris.*, 325.

IV. General medico-legal questions that may arise in the investigation of all the wounds, however or wherever inflicted, including the legal principles applicable to this head.

Under this division arise a great many interesting subjects of inquiry. These, as far as possible, should be presented in a natural order. They are the following:

1. What was the weapon with which the wound was inflicted, and what are the questions generally arising in the case of sword and gun-shot wounds?

2. Was the wound self-inflicted or accidental, or the act of another?

3. What circumstances can be gathered relative to the motive or intent of the inflictor?

4. What acts indicate volition or locomotion after the infliction of mortal wounds?

5. How long has the wound been inflicted?

6. Was the wound the direct cause of death?

7. What are the circumstances that modify the medico-legal character of wounds, and that vary the liability of the inflictor?

8. What are the questions that arise in the case of maiming?

9. How should the medico-legal examination of wounds be conducted?

1. What was the weapon with which the wound was inflicted, and what are the questions generally arising in the case of sword and gun-shot wounds?

It may become important, for many reasons, to ascertain the kind of weapon by which the wound was inflicted. It may be a means of identifying the murderer. It may serve to qualify, in some measure, the nature of the action, rendering it murderous or not, according to the weapon made use of. Murder, in the State of New-York, may consist in killing another, either

1. From a premeditated design to effect the particular death effected, or any death:

2. When the death is perpetrated by any act imminently dangerous to others, and evincing a depraved mind, regardless of human life, although without any premeditated design to effect the death of any particular individual:

3. When it is perpetrated without any design to effect death, by a person engaged in the commission of any felony.

The character of an act imminently dangerous to others, and evincing a depraved mind, regardless of human life, can be, to a considerable extent, identified by a reference to the instrument used, coupled, also, with the manner of using it. Hence, so far as these are to be inferred from the nature of the wound, medical testimony will go towards identifying the crime of which the person committing it may have been guilty.

In the case of *The People* vs. *Rector*, for the murder of Shepard, tried some years since in the city of Albany, the prisoner was charged and found guilty, on one trial, of perpetrating that crime, because he made use of the bar by which his door was fastened, striking the deceased with it a blow or two on the head, in such a manner, and under such circumstances, as that the act was imminently dangerous, and evinced a depraved mind, regardless of human life. It was claimed in defence, that the injury which caused the death was not inflicted by the blow, but arose from the fall of the deceased on the side-walk or curbstone.

The probable manner, force, and weapon employed, are to be collected from the nature and extent of the wounds inflicted, judging from the known effects of certain weapons when applied with different degrees of force. *Watson on Hom.*, 252.

The remarks to be offered in the discussion of this question, will be the best arranged under three heads, viz., those affecting contused, incised and gunshot wounds.

1. *Contused.* The variety of means by which contused wounds may be inflicted, the diversity of instruments that may be employed in their infliction, and the varying degrees of force that may have been made use of, all create a greater difficulty in ascertaining the manner of their infliction, and the weapon which had been employed, than is found to exist in any other class of injuries. It is not easy, it is often impossible, to say whether such a wound has resulted from a weapon, or a blow of the fist, or from the person injured having fallen against a hard body. There are but few indications that can enable a witness to say, that a wound on the head was produced by a weapon, and not by a fall. If the wound be inflicted on the top of the head, it is probably produced by the use of a weapon. So also if there be contused wounds on several parts of the head, with copious effusion of blood beneath the skin. *Taylor's Med. Juris.*, 249.

It is possible to infer, to some extent, how the injury had been inflicted, from the superficial or deep seated character of the contusion. If a stone is struck smartly with a small hammer, the blow is principally expended on the surface, while the interior remains uninjured. But if the same is struck a slow, heavy blow, with a ponderous hammer, the force penetrates the interior, and shivers its centre, producing little or no injury of the surface. This principle applied to contusions on the human body justifies the general inference, that contusions of a superficial character have been inflicted by the smart stroke of a comparatively light body, while those which are deeper seated have been occasioned by heavy blows from a more ponderous weapon. *Watson on Hom.*, 253–4. It is much upon this principle, that we can explain the fact heretofore mentioned, that there are many instances on record where death has resulted from a violent contusion, without leaving any external mark of injury.

2. *Incised*, including *punctured wounds.* In this class, a close attention to the nature of the wound will justify an inference as to the probable weapon by which it was inflicted. Reference must be had more particularly to its form, the appearance of its edges, its situation, extent, and termination. *Watson on Hom.*, 255.

Punctured wounds generally take the shape of the instrument by which they are caused. This, however, is not always true, as a cylindrical pointed weapon may produce elongated wounds, having two edges, the direction of the wound being the same as that of the muscular fibres of the part. The wound is more usually round where there is much adipose matter.

In *stabs* or *sword thrusts*, the form and depth of the wound will generally indicate the kind of weapon employed. These are apparently smaller than the weapon, owing to the elasticity of the skin. In those sword thrusts, or stabs, that have traversed the body, it is important to notice that the entrance aperture is generally larger than that of the exit. The edges of the former are sometimes found everted, owing to the rapid withdrawal of the instrument. *Taylor's Med. Juris.*, 248.

In incised wounds, the cleanness and regularity with which the edges are cut, will furnish an inference in regard to the sharpness of the instrument; and in the case of a punctured or an incised wound, it is important to ascertain the situation of the edges, to see whether they are lacerated and irregular, or clean cut, indicating that a sharp instrument has been employed. The defence interposed not unfrequently is, that the deceased had fallen on glass or some other substance that had caused the injury.

A case, strikingly illustrating this, is cited by *Mr. Watson*, that of *Mrs. Pollock*, *page* 256. On examining the body, and separating the labia pudendi, a wound about an inch and a quarter in length was found upon the inner side of the right nympha. It was a clean, straight incision, and internally admitted the introduction of the finger in four different directions to the depth of about two and a half inches each. In each direction the wound had nearly the same diameter, and an obtuse termination. None of the large vessels had been wounded, nor the peritoneum penetrated. The indications afforded by the cleanness of the cut, the obtuse termination of the wounds, their small depth, and the absence of any injury of the important neighboring parts, all pointed to an instrument having a sharp edge and a round or blunt point. The medical witnesses, therefore, had little doubt but that this instrument was a razor, and in confirmation of their conclusion, one was afterwards found, concealed in a piece of cloth, having its blade and handle covered with blood. One of the defences here interposed was, that the deceased had fallen upon a piece of broken earthen-ware and cut herself; but the answer made was, that in such a case the wound would have been a lacerated one; of no great depth, not larger internally than externally, in no part greater than the size of the wounding body, and probably not having different directions internally.

In the case of Mrs. Calderhead, also stated by Mr. Watson, page 258 – 9, the death was caused by the hæmorrhage, which proceeded from a wound upon the middle of the left labium pudendi. It was a clean incision about three-quarters of an inch in length, having a straight direction parallel with the margin of the labium. The wound consisted of a bloody cavity, from which the finger passed to a greater depth in three different directions. The greatest depth was between two and three inches. The divided vessels, and the internal surface of the wound, had the appearance of having been very clean cut by a sharp instrument. Near her was found some pieces of a broken wine glass, and the question was whether the wound could have been occasioned by her falling upon these broken pieces of glass. For the reasons assigned, it was judged by the medical witnesses to be scarcely possible, and very improbable, that the wound could have been thus produced; and from the straight, clean incision, the length, extent and cleanness of the wound internally, and its different directions, it was rendered very evident that the instrument was a knife, and that the wound was produced by several thrusts of it, each varying in the direction taken.

In another case, one man was struck by another and knocked against a window. No weapon had been seen in the hand of the prisoner, but there were three deep cuts on the face of the deceased. The medical witness deposed that the wounds appeared to have been inflicted by a knife or razor blade, and that no particles of glass had been found in the wounds, as would have been likely to have been the case had they been inflicted by the broken glass. Wounds made by glass are characterised by their great irregularity and the unevenness of their edges. *Taylor's Med. Juris.*, 248.

3. *Gun-shot wounds.* Many questions may arise, and some of a very difficult nature, in cases of gun-shot wounds. They are of the contused kind, but differ from that class generally, in having the vitality of the part struck destroyed, leading rapidly to the process of sloughing. *Taylor's Med. Juris.*, 328.

A gun-shot wound can, in general, be easily distinguished from any other. The death resulting from it may proceed from the hæmorrhage or shock. Unless some large blood vessel happens to be severed, or torn by the ball or shot, the hæmorrhage is not likely to be very extensive. Death is sometimes occasioned by the shock given to the nervous system, as in the case of Daly, (*Taylor*, 328,) who died in a few seconds, the bullet having traversed the distended stomach at the cardiac end from behind forwards.

One of the questions the most frequently arising, is, was the wound inflicted *before* or *after death?* This is extremely difficult to answer. If the ball has struck and injured a large blood vessel, the hæmorrhage, and formation of coagula, may afford a pretty clear indication that it was inflicted during life. A ball penetrating a body after death, would cause no hæmorrhage, unless it happened to wound a large vein. If the ball, in its course, has injured no large vessel, the simple inspection of the wound will hardly enable the medical witness to say whether the wound was inflicted previous or subsequent to death.

Another question frequently arising is, was the ball fired *near the deceased, or from a distance?* When the muzzle of the piece is placed near the surface of the body of the deceased, the following are the characteristics of the wound, as given by Devergie. *Taylor's Medical Jurisprudence*, 329.

1. A superficial bluish color of the skin, arising from the contusion caused by the explosion :

2. Particles of charcoal and ignited powder imbedded in the skin :

3. Slight burning :

4. Coagulation of blood, mixed with the powder, on the lips of the wound.

If the muzzle be in direct contact, the skin will be found torn and lacerated, in addition to being burnt; but if not, the wound will exhibit a rounded appearance. This rounded appearance, however, will not be presented, unless the ball strike the body at right-angles, or nearly so. If it strike it obliquely, the orifice is of an oval or valvular form; and this may furnish something of an indication relative to the position occupied by the assailing party.

The parts of the body traversed by the ball, and the varying degrees of resistance interposed, may afford some indication as to the distance from which it was fired. As the force will be so much modified by the strength of the charge, this, perhaps, should be but little relied upon. If fired from a moderate distance, the entrance hole will be found well defined, round or oval; the skin slightly depressed inwards, the edges being inverted, and presenting a faint bruised appearance. The exit hole is considerably larger, sometimes three or four times, than the entrance; more irregular, the edges being everted, and the skin lacerated, but free from marks of blackness or burning. When the ball has perforated flat bones, the same difference, but less in degree, is observed between the size and appearance of the two openings. 2 *Beck's Med. Juris.*, 76; *Taylor's Med. Juris.*, 329.

The living skin is so elastic that the entrance aperture will generally have the appearance of being smaller than the ball. So, also, if the dress be composed of an elastic material, the hole made in it is smaller than that made by the ball in the integuments.

The appearances presented by a wound made by a rifle ball will be different from those made by one from a common musket. The former acquires a spiral motion from the spiral groove made in the barrel, and hence makes a ragged hole, much larger than itself. 2 *Beck's Med. Juris.*, 78-9; *Taylor's Med. Juris.*, 339.

Some indications can be sometimes drawn from the hole made in the dress, as to the direction from which the ball was fired. If from a moderate distance, the entrance aperture is round, and the margin regularly defined; but the exit aperture is irregular and torn. *Taylor's Med. Juris.*, 330.

It sometimes becomes very material to determine, whether the gun was fired near the deceased, or from a distance. A case involving this question, occurred in Ireland, in 1834. The question, whether, in a scuffle, a pistol had accidentally gone off, and occasioned the death, or whether the person had deliberately fired at him from some distance. The sons of the deceased swore that the pistol was fired from some distance, the prisoner taking deliberate aim. This was confirmed by the priest, who deposed that such was the dying declaration of the deceased. But on a careful examination of the body, which was disinterred for that purpose, the surgeon was enabled to swear positively, that the pistol must have been fired close to the body of the deceased, as there distinctly appeared the marks of powder and burning on the wrist. So conclusive was this evidence deemed, that the prisoner was acquitted, and the parties who had appeared as witnesses against him, were indicted and convicted of perjury. *Taylor's Med. Juris.*, 330.

So, in another case, a soldier placed as a sentry, was found severely wounded, the calf of his leg having received a discharge from a musket, and being greatly torn. He attributed it to a shot from the enemy; but on examination, the skin of the leg was found completely blackened with charcoal, thus rendering it perfectly clear that the wound had proceeded from the discharge of his own musket, his object being to get a discharge from his regiment. *Taylor's Med. Juris.*, 331.

It is important to observe, that, under some circumstances, one ball may produce several wounds on or in the body, owing to its splitting and taking different directions. This has repeatedly occurred, where the ball has encountered an angular surface, or a projecting ridge of bones; and sometimes, without encountering an angular surface. One instance is mentioned, in which the ball, having struck the ridge of the tibia, divided itself into two parts, which, after having traversed the calf of that leg, penetrated into that of the other; thus inflicting no less than five wounds—three of entrance and two of exit. So, also, a ball which struck the parietal bone, divided into two portions, one of which passed out through the integuments, while the other penetrated into the substance of the brain. *Ib.*, 331 – 2.

There are also some singular, and indeed very extraordinary, instances on record, where the ball has been deflected from its rectilinear course, and pursued an extremely circuitous route. This is apt to occur when it strikes obliquely a curved surface, and it seems unnecessary that it should come in contact with bone, but may also take place on meeting with skin, muscles, tendons and fasciæ. Thus, where two openings in the scalp were found nearly opposite each other, it was found that the ball had not penetrated the bone, but had followed the curve of the cranium to its place of exit. *Ib.*, 332 – 3.

A ball entering at the ankle made its exit at the knee. Another entering at the back of the left shoulder, was found below the right mastoid process. A ball which had entered near the thyroid cartilage, passed quite round the neck, and was found at the spot at which it entered. Another instance is mentioned by Dr. Hennen, where the ball struck the breast and lodged in the scrotum, the man standing erect in the ranks. *Taylor's Med. Juris.*, 333; 2 *Beck's Med. Juris.*, 78.

In the case of *The King* vs. *Morgan*, which occurred in 1835, (*Taylor*, 333,) the question was raised, whether in case the gun bursts, the ball will take the direction which it would otherwise have taken, had it remained entire. It was held that the bursting of a gun is posterior to the impulsive direction given to the charge, and that therefore it will take the same direction it would have taken if the gun had not burst.

It is generally a very material enquiry, to ascertain the direction from which the ball has been fired. This can be easily and quite satisfactorily ascertained, if two fixed points can be found where the ball has touched without being reflected. The following case occurred, illustrating this. Several shots had been fired into a church; some balls entered at a window, and also struck against a wall on the opposite side of the church. A line connecting these two, and extended out, would reach a window on the opposite side of the street, from which the shots had been fired. *Taylor's Med. Juris.*, 333.

Another question which sometimes becomes important to settle, regards the position of the party shot, at the time the charge takes effect; whether he were standing, falling, or lying down; or whether he was advancing or retiring. This depends much upon the circumstances of each case. In case of a person shot standing, the gun being pointed from the shoulder, the course of the ball will generally be transverse; although, as we have already seen, it may become deflected.

A trial involving some of these questions, will be found reported by Dr. Gordon Smith; also, in 2 *Beck*, 76 – 7, and in *Taylor*, 335 – 6. A man in company with a party of smugglers, was shot in the night. The prisoner and his men were pursuing them, and while so pursuing, he tripped, and in the fall, his gun went off. The smugglers also were firing on the prisoner and men in pursuit. The point to determine was, from which party the fatal shot came, as the deceased was between his own party, who were retreating and firing, and the prisoner and his party who were pursuing. If, therefore, the ball entered in front, it must have come from his own party; if in the rear, from the prisoner. One of the witnesses examined was a navy surgeon, who found the wound in the upper part of the groin much smaller than that in the lower part of the buttock, the latter being twice or three times the size of the former, and quite ragged and uneven. In the hinder opening were also found fragments of bone, but none in the cavity of the pelvis. He was therefore of opinion, that the ball had entered in front, and had come from the smugglers.

Another case is reported in the English State Trials, of one Richard Annesley, who asserted that his gun had accidentally gone off in attempting to secure the deceased, who was a poacher. The evidence of the surgeon was, that the direction of the wound was upwards, and that, in his opinion, therefore, the fowling-piece had not been levelled from the shoulder. 2 *Beck's Med. Juris.*, 77; *note.*

Where the charge consists of small shot instead of a ball, a more certain evidence is furnished in regard to the distance from which it was fired. This arises from the tendency of the shot to scatter after leaving the gun barrel. When the discharge is very near, the shot strike without spreading, and make a round hole, but produce very extensive lacerations. In order to do that, however, the distance cannot be greater than ten or twelve inches from the surface of the body. When the distance exceeds twelve, and ranges between twelve and eighteen, the opening is irregular, and borders much lacerated. When fired from a distance of thirty-six inches, the central opening becomes entirely lost, and the surface of the body more or less covered with shot. Thus after the distance becomes so great that the central opening is lost, the greater the spaces between the pellets of shot, the greater must have been the distance from which the gun was fired. This, it is true, will be modified by the goodness of the gun, and the strength of the charge, as well as by the distance. *Taylor's Medical Jurisprudence*, 336.

Another question connected with gun-shot wounds which has arisen for investigation and settlement, is, whether a person firing a gun or pistol in a dark night, can be identified by means of the light produced by the discharge. Two or three cases have occurred in which this question has arisen. In the case of *Rex* vs. *Haines*, (see *Taylor*, 338,) some police officers were shot at by a highwayman during a dark night. One of the officers stated that he was enabled, by the flash of the pistol, to see that the robber rode a dark brown horse of such a remarkably shaped head and shoulders, that he could identify him, and had since done so at a stable in London; and also that the person firing it had on a dark brown great coat. In the case of the *Queen* vs. *White*, which occurred in 1839, a gentleman was wounded in the elbow by a shot fired at him while riding home in a gig on a dark night. He observed the flash of the gun, saw it was levelled towards him, and was enabled by the light of the flash, to recognize the features of the accused. He was quite sure he was not mistaken in his identity.

Many experiments have been made with a view to the settlement of this question, the result of which seems to be, that on a very dark night, and away from every source of light, a person who had fired the gun might be identified within a moderate distance. But if the flash were very strong, the smoke very dense, and the distance great, he could not be identified by such means. *Taylor's Med. Juris.*, 337–8.

2. The second general question that arises is, was the wound self-inflicted, or accidental, or the act of another? The settlement of this question must depend much upon the peculiar circumstances of each individual case. It may be important to attend

1. To the situation in which the body is found.

A body found in a room locked on the inside, the throat cut, and the instrument of death near at hand, would not only justify, but require the inference that the act was suicidal. So also it would be about equally clear, if a body were found divested of life by a similar wound, in a room accessible to others, the weapon of death being removed, that it was neither suicidal nor accidental, but the act of another. Where there has been a secret burial, or an attempt to wash away stains of blood, or to conceal any of the evidences by which the nature of the transaction would be likely to be revealed, the inference of suicide would be negatived, and the fact of murder be rendered apparent. Any cut or thing clearly evincing design, would go far towards making out a case of intentional homicide. Where a body is found at the foot of a precipice, having upon it the marks of severe contusions, the inference of accident or suicide is very strong. *Watson on Hom.*, 264 – 5.

2. The nature and situation of the wound or injury, may indicate the manner in which this question should be settled. So far as the nature of it is concerned, it may be assumed that contusions are seldom self-inflicted, but they may result either from accident or homicide. They may, it is true, be produced by one's throwing himself over a precipice or out of a window, but in such cases the cause of death is very apparent. The marks of injury found upon a body, at the foot of Salisbury crags, consisted of a black eye, and slight cuts on the head, a large wound on the sacrum, and a severe fracture of the left ancle joint. These left little doubt, but that the death was due either to accident or suicide. It is very important to examine the situation of a contusion. It may be found on a part of the body which could not well have been injured by an accidental fall, as on the inner side of the arms or legs. Those very severe contusions or lacerations that must necessarily have been produced by a ponderous weapon, such as an axe or hammer, have, in all probability, been inflicted by another for a murderous purpose. *Watson on Hom.*, 269 – 70.

The anterior or lateral parts of the body, are the more generally wounded in case of suicide, as they are the most easily accessible. Where cutting instruments are employed, the throat and chest are the parts the most commonly selected. Where fire arms are made use of, the region of the heart, the mouth, the orbit and the temples, are the parts frequently chosen. In more general terms, the most exposed parts of the body are the most likely to become the recipients of wounds which result from accident or suicide, while those which are inflicted in a concealed, or not easily accessible part, afford presumptive evidence of murder. It is a fact generally true, that all accidental wounds are to be found in exposed parts of the body. There are, however, several wounds of exposed parts that are of such a nature as almost to preclude the idea of their being accidental; such, for instance, as deeply incised wounds of the throat, and gun-shot wounds of the mouth and temples. *Taylor's Med. Juris.*, 251–2.

It sometimes becomes necessary to determine whether the individual met his death by falling on the weapon, or by having it thrust into him. This question arose in the case of J. Scheffer, who was found dead with a wound two fingers breadth below the nipple, and between the second and third ribs. The defence was, that he had met his death by rushing on the sword of the accused. *Taylor*, 251 – 2.

To this it was answered, that this was impossible, as the wound was on the right side, and that it could not, therefore, have been inflicted unless he had run sideways. The medical faculty of Giessen, gave their opinion in favor of the defence, for the reason, that the deceased being at the time drunk, and in a great rage, probably assumed that kind of motion which the French call *passade*, by which the wound could have been inflicted in the manner it actually presented. 2 *Beck's Med. Juris.*, 70.

3. The direction of the wound will sometimes afford an indication whether it be suicidal, accidental or homicidal. In suicical wounds affecting the throat, the direction of the cut is the most commonly observed to be from left to right, either transversely or obliquely from above downwards. In suicidal stabs and punctured wounds, the direction is commonly from right to left, and from above downwards. This, however, is on the supposition that the individual was right handed, which is not al ways the fact. One good method that has been recommended is to place the weapon in the hand of the deceased, and then, by moving the hand and arm, ascertain whether the wound could possibly have been inflicted by him or not. Oblique wounds passing from above downwards are very common both to homicide and suicide. *Taylor's Med. Juris.*, 255.

Those wounds which take an oblique course from below upwards, are more commonly the result of homicide. The instrument should be carefully compared with the wound. Its adaptation to the edges of the incision should be ascertained. Its sharpness should also be compared with the cleanness and evenness of the cut, and its length with the depth of the incision or stab. The regularity of the wound, and the cleanness and evenness of the cut, have been considered by some as affording presumptive evidence of suicide, and by others, of homicide. Some assert that an incised wound which is self inflicted, is likely to be jagged and uneven, arising from the supposed inquietude and want of resolution of the suicide. Again, others suppose that such jaggedness and unevenness will be much more likely to occur in homicide, where there is undoubtedly resistance made to the attempts of the murderer. Sir Everard Home, in the case of Sellis, the servant of the Duke of Cumberland, says "I went to his apartment, found the body lying on its side on the bed, without his coat and neckcloth; the throat cut so effectually, that he could not have survived a minute or two. The length and direction of the wound was such as left no doubt of its being given by his own hand; *any struggle would have made it irregular.* He had not even changed his position, his hands lay as they do in a person who has fainted; they had no marks of violence upon them, his coat hung upon a chair, out of the reach of blood from the bed; the sleeve, from the wrist to the shoulder, was sprinkled with *blood quite dry, evidently from a wounded artery.*" 2 *Beck's Med. Juris.*, 82.

The direction of the wound, together with some other circumstances, became material in a case cited by Dr. Beck from Foderè. See 2 *Beck*, 71. A contest arose between a miller and a butcher. The former was killed, but the latter pretended he had no intention of killing him, but had only threatened him with his knife; that the miller renewed the attack, and in attempting to pursue him, made a false step and had fallen on the weapon. An examination disclosed the fact, that there was a single external wound, which led downward to two wounds of the left ventricle of the heart, separated from each other by an interval of two lines. This showed very clearly that the accused had employed the same method to destroy his victim, as that used by butchers in Germany to kill cattle; that is, after having driven the knife into the heart, they withdraw it some distance, and re-plunge it, so as to make a second internal wound. This peculiarity in the direction of the wound, compared with the respective statures of the two parties, the miller being much the larger of the two, proved that the blow had been inflicted obliquely from above downwards, and must have been so inflicted while the miller was sitting at his door, and not by a fall after getting on his feet, in which case the wound must have taken an opposite direction.

Another rather remarkable instance is mentioned by Taylor, page 253. The body of a farmer was found lying on the high road, the throat severely cut, and the death having obviously been caused by the great hæmorrhage that had taken place. At some distance from the body a bloody knife was discovered, and his pockets were found to have been rifled of their contents. The wound of the throat, on being examined by a surgeon, proved conclusively from its direction, that it could not have been self-inflicted. It was not cut in the manner of suicides, by carrying the cutting instrument from before backwards. The knife had been first passed in deeply under and below the ear, and then brought out by a semi-circular sweep in front, all the great vessels of the neck, together with the œsophagus and trachæa, having been divided from behind forwards. It was obviously done in the same manner that the throats of sheep are cut when slaughtered by a butcher. This circumstance not only negatived the idea of self-murder, but served also to detect the murderer, who was subsequently tried and executed, and proved, according to the indication furnished, to have been a butcher.

A very singular case, that of Augustus Dautun, occurred in Paris in 1814. The body was found cut into four or five parts, the head having contusions on it, and there being wounds in the chest. All the different portions were carried to the Morgue, and a model in plaster taken of the bust. By means of this plaster model the body was afterwards identified, a wart being found on the upper lip, and the bones of the thigh proving that the individual had been lame.

The principal wound was in the chest, which was found to have penetrated to the heart. It was larger within than at the surface, and a second wound was discovered in the aorta two inches higher than the other. The appearances very clearly justified the conclusion, that a second blow had been given with the dagger, before withdrawing it, merely altering its direction.

The murderer was found to have been his brother Charles Dautun. The means of his identification, as related by Zerah Colburn, were very curious, and sufficiently so, to merit insertion:

"In the teeth of the dead body, tightly compressed, was a piece of human flesh, apparently torn out in the dying struggle. After some time, Dautun, the brother, was gambling at the Palais Royal, and becoming angry, threw a glass at the waiter. It was shivered into pieces, and a fragment was carried into Dautun's wrist, under the cuff of his coat. The spectators wished to examine the injury, but he obstinately refused. At last, suspecting something mysterious, they pushed up the sleeve by force, and there beheld a scar recently healed, as if made by the tearing out of flesh. The landlord had been at the Morgue, and seen the plaster model. He therefore delivered him to the legal authorities, as probably the murderer."

A companion in debauchery of Dautun was implicated and tried as an accomplice; and on the trial, Depuytren was asked the important question, if any marks on the dead body could indicate whether the murdered person had been attacked by one or more persons. He replied, that he could say nothing except as to probabilities, but that it appeared to him that a plurality of persons had been engaged in the murder, and he assigned the following ingenious reasons:

"When a man is struck, his first act is to present his hands as a defence against the blow. In this case, there was not the slightest mark of injury on them. The same person that inflicted all these wounds could not, at the same time, have held them. Again, the wounds on the head must have preceded those on the chest. These were mortal, the thorax containing four pounds of blood. While the hands were held, might not the head have been interposed to prevent the wounds in the chest." 2 *Beck's Med. Juris.*, 88-9.

"In a case mentioned by Orfila, a body was found divided into two parts by means of a cutting instrument pressed into the fibro-cartilage, uniting the third and fourth lumbar vertebræ.

The articulating process of the vertebræ had been cut transversely through, as butchers are accustomed to cut through the spines of animals. M. Ouvrard was led to suspect that the man who had committed the murder was a butcher; and this turned out to be the case." *Guy's Principles of Forensic Medicine*, 478.

It is stated generally, by Watson, that if a self-destroyer effects his purpose by a cutting instrument, or incisions, he selects the throat; that if he stabs himself, he selects the chest or belly; and if he shoots himself, he generally does it through the head. *Watson on Hom.*, 276.

It is to be observed, that suicidal gun-shot wounds are almost always directed to a vital part, either to the brain or to the heart. Another important thing to notice is, that they possess the character of wounds inflicted near the body, such as the blackened and burned skin, the wide and lacerated wound, the discharged pistol near the hand, often blackened by its discharge, and sometimes within its grasp. *Taylor's Med. Juris.*, 334.

An interesting case illustrating this last remark, occurred in France, in 1835. The body of the deceased was found sitting in a chair by the side of the bed, his elbow resting on the bolster, and his right hand laying over the right thigh, and grasping a pistol which appeared to have been recently discharged. The death was evidently caused by a severe gun-shot wound of the head. The son slept in the same room with the deceased, and he was accused of having murdered his parent, and then of having placed the pistol in his hand, to give the whole the appearance of suicide. There were some moral circumstances against the son; but the fact principally relied upon, was, that when the hand, with the pistol within it, was carried to the position in which the weapon must have been held by the deceased, to have committed the fatal act himself, and the hand was afterwards allowed to fall by its own weight, the pistol each time fell from the hand to the floor. The medical witness, after some reflection, satisfactorily accounted for the hand retaining the pistol after death, by the contractile state of the muscles continuing under the form of cadaverous spasm. The fact that knives and razors, as well as pistols, are not unfrequently found grasped in in the hands of suicides, is accounted for on the same principle. It is owing to the muscular spasm persisting after death, and which is quite distinct from cadaverous rigidity. *Taylor's Med. Juris.*, 261.

Suicidal gun-shot wounds will very seldom be fired from behind, so that if the entrance is at the posterior surface of the body, the presumption is against suicide, and in favor of homicide. A gun-shot wound in the mouth or temples, would not generally be considered as accidental.

4. The number of the wounds is another circumstance, from which, it is said by some, an inference can be drawn in reference to their being of accidental, suicidal, or murderous infliction. It may perhaps be asserted, as a general rule, that the suicide inflicts but one wound, viz., that which destroys life; and with those who are determined, and inflict it with a lethal instrument, the rule is most likely to hold good. At the same time, it is perfectly clear, that the murderer can kill by one wound. So also the suicide may inflict upon himself several wounds. The principle is, that the infliction of two mortal wounds, by the suicide, is not a credible supposition; because, by the infliction of one, his mind would be so much impaired, and his strength diminished, that he would be unable to inflict another. If the first were of a nature to stun him, and thus deprive him of sensation, or if the trunk of a great artery were cut, or the heart or brain traversed, this would probably be true. But many wounds are necessarily mortal, and yet permit many acts of volition to be afterwards done by the person upon whom they are inflicted. *Taylor's Med. Juris.*, 257; 2 *Beck's Med. Juris.*, 79–80; *Guy's Principles of Forensic Medicine*, 478.

To illustrate this, the following case may be mentioned: A gentleman of Rouen was found dead in his chamber; in the room were found two pistols, one near the body, and the other on the bed, at some distance from it. It was ascertained that the deceased had shot himself in two places. One wound had completely traversed the left side of the chest, breaking a rib before and behind, perforating the lung through its middle portion, and passing near to the roots of the pulmonary veins. This was apparently inflicted while he was lying on the bed, and had caused a very large quantity of blood to become extravasated in the thorax. Notwithstanding the infliction of this mortal wound, it appeared that he must have risen from his bed, and walked to a closet to procure another pistol, with which he inflicted a second wound, that must have proved instantly mortal, the ball having entered at the frontal bone, and, after traversing the left hemisphere of the brain, had become lodged against the os occipitis. This was established to have been an act of deliberate suicide. *Guy's Principles of Forensic Medicine*, 478.

It is, however, true, that the greater the number of wounds inflicted, the more are multiplied the chances of demonstrating that they must have been of homicidal infliction. A case occurred in New-York in 1839, under the following circumstances: A woman was found dead, with many wounds upon her body. The husband, who was suspected, asserted that she had destroyed herself. On examination, there were found eleven stabs, eight on and about the left side of the thorax, one of which had penetrated the pericardium, and divided the trunk of the pulmonary artery at its origin, while the others were on the back, near the left scalpula. There was every reason to suppose that the stabs in front and at the back were inflicted at the same time; and it was obviously quite impossible that the latter could have been self-inflicted. *Taylor's Med. Juris.*, 257 – 8.

When several wounds are self-inflicted, it is often only one that is mortal, and has caused the death. The multiplicity of the instruments that have been employed, causing several different wounds, may not unfrequently lead to the conclusion that the act was murderous. A woman was found dead nearly twelve months after she was first injured. Her body was identified. A handkerchief was drawn tight round the neck, while a wound from a pistol ball was traced through the left side of the chest, passing out at the right orbit. Three other wounds were also found, all made by a sharp instrument, and one of which had entered the heart. The defence was, that the deceased had committed suicide, but the great variety of the means and instruments employed to produce death, together with the fact that the gun-shot wound in the head, the stab in the heart, and the act of strangulation, were, each one of them, sufficient to account for speedy death, left no doubt that it was an act of murder. *Taylor's Med. Juris.*, 259.

It must not, however, be forgotten, that suicides, especially if laboring at the time under insanity, often inflict upon themselves many wounds, and sometimes those of a singular character. A gentleman, for instance, was found lying in a state of insensibility in his kitchen, with a cleaver by his side. Upwards of thirty wounds were found to have been inflicted over the posterior portion of the occipital bone. Many of these were superficial, and they all had a horizontal direction from behind, forwards. A portion of the skull, from the middle of the lambdoidal suture, had been removed by one, and from this, a part of the brain had escaped. The person afterwards recovered so far as to admit that he had inflicted the wounds on himself. He died at the expiration of four days, and was a lunatic. *Taylor's Med. Juris.*, 253.

The general remark has been made, that suicides, when foiled in a first attempt at self-destruction, continue to use the same weapon. *Ib.*, 257.

This is probably generally true, but sometimes a severe incision in the throat has been succeeded by shooting themselves, or adopting other methods of self-destruction.

5. Some indications may possibly be gathered from the countenance of the deceased. That of suicides is usually haggard, the eyes sunken, and this kind of physiognomy continues while there is any vitality remaining. The victims of assassination, on the contrary, have a greater degree of paleness and fear imprinted on the countenance. 2 *Beck's Med. Juris.*, 75.

6. Circumstantial evidence. This embraces a wide range of enquiry, and may very well include several considerations already alluded to. Very much of it may also belong to the non-professional witness. A brief allusion to a few circumstances, is all that can here be attempted.

Very few crimes of great enormity, and involving a resort to violence in their perpetration, can be committed without leaving such traces in the circumstances, by which they are attended, as to lead to the detection and conviction of the perpetrator. It is rare indeed, that any amount of coolness and calculation, any degree of ingenuity, or any power of foresight, has ever been sufficient to disentangle one from the meshes of that interminable web of circumstances, which is interwoven around, and into, the nature and character of every criminal act. It constitutes one of the great guarantees which God has given, that the perpetrators of crime shall not go unpunished.

Sometimes the slightest circumstance has led to the detection of the criminal. In 1806, a Mr. Blight was mortally wounded by a pistol-shot. No clue seemed to be afforded as to the person who had discharged it, until Sir Astley Cooper, from an examination of the localities, was enabled to say, that the shot must have been fired *by a left-handed man.* There was only one person of that description near the premises, a Mr. Patch, a particular friend of the deceased, and not in the least suspected. Through this disclosure, he was afterwards tried and convicted of the crime, and made a confession of his guilt. *Taylor's Med. Juris.*, 260.

The presence or absence of the weapon with which the wound was inflicted, taken in connexion with the extent and mortal character of the wound, must afford strong circumstantial evidence of suicide or homicide.

In the case of Courvoisier, who was tried for the murder of Lord William Russel, there were two facts relied upon to show that it was not a case of suicide. One was, that a napkin was placed over the face of the deceased, and the other, that the instrument of death did not lie near the body. *Guy's Prin. of Foren. Med.*, 480 ; *Taylor's Med. Juris.*, 262.

The presence of a lethal instrument near the body is, by no means, a proof that the case is one of suicide. A pistol has been found near the deceased, of such a calibre that the ball which had caused the death was of too large a size to enter it.

In the celebrated case of the Earl of Essex, which gave rise to much contrariety of opinion, there were several points of circumstantial evidence, of which I shall notice only one:

In July, 1683, he was found dead in the tower, with his throat cut, and a razor lying near him. The throat was smoothly and evenly cut from one side to the other, and entirely down to the vertebral column. Notwithstanding this the razor was found to be much notched on the edge. This fact those who favored the view of suicide were asked to explain. They could do so no other way than by supposing that the deceased had notched the razor by drawing it backwards and forwards on the neck bone. This he could hardly be deemed competent to do after all the great vessels of the neck had been divided. *Taylor's Med. Juris.*, 262; 2 *Beck's Med. Juris.*, 82–3, 4.

The case of Jane Norkott which occurred during the reign of Charles I., afforded a striking instance of a conviction upon circumstantial evidence. She was found dead in her bed with her throat cut. There were here two circumstances going to show that it was not a case of suicide as at first supposed. The one was that the bloody knife was found sticking in the floor, a good distance from the bed, but as it stuck the *point was towards the bed and the haft from it.* The other was that on the *left hand* of the deceased, was the bloody impression of a *left hand.* 2 *Beck's Med. Juris.*, 86–7; *Guy's Principles of Forensic Medicine*, 480. It should here be remarked without dwelling upon it, that the marks of blood afford much material for circumstantial evidence.

3. The third general question proposed for discussion was—What circumstances can be gathered relative to the motive or intent of the inflictor?

It is well known that to constitute crime, the moral element must enter, as a constituent part, into the action which it essentially qualifies. It is this that creates the wide difference between a mere injury, and a wrong. The first may be caused by the kick of a horse, or the blow of a maniac. The last can only proceed from a rational creature, a free moral agent. The first is limited in its effects to the mere physical nature which it injures. The last extends to, and embraces the moral nature, and is there felt as a wrong done to that nature. Hence the law always requires a *felonious intent* to be clearly shown, either directly or inferentially, before conviction can be obtained for the commission of a crime. Any circumstances, therefore, attending its commission, which will throw any light upon the question of intent, provided the fact of homicide be first established, should be seized hold of and eagerly appropriated. In the general questions already discussed, especially the last one, many remarks, and some cases will be found bearing directly upon this question. These, it will be unnecessary to recapitulate. What then are the facts and circumstances from which the intent of the party can be gathered?

1. We must look at the nature, situation, direction, and extent of the wound. When found inflicted in a concealed part, such as a superficial observer would not be likely to notice, the inference of intent is strong. The female organs of generation have been selected as a part where a mortal wound could be inflicted, and the greatest chance of escape from its consequences afforded. The inflictors of such wounds must have entertained the impression either that they could escape entirely from the want of observation, or that the blood, if observed and traced to the organs, would be attributed to flooding, to which females are frequently subject, or that, if the wound was actually discovered, it might be accounted for by the female's having accidentally injured herself by sitting down upon some sharp body. So confident have they been of success that in some cases they have been the first to go for medical aid for the deceased. *Watson on Hom.*, 272–3.

In the case of Pollock, which occurred in Edinburgh in 1826, see *Watson*, 104, a wound about an inch and a quarter long, was found, on separating the labia pudendi, upon the inner side of the right nympha. It was a recent clean incision, admitting the point of the finger which could be inserted in four several directions, where the cellular membrane had been divided in each of these directions to the depth of two and a quarter inches. None of the large vessels had been wounded and death had obviously resulted from hæmorrhage. In the case of the Duncans, also reported in Watson, 105, the wound was a clean incision, three-quarters of an inch in length, inflicted in the middle of the left labium pudendi. The greatest depth was about three inches, several large blood vessels being severed. In the case of McTeat, in 1830, reported by Watson, page 106, two wounds were found, one on each side of the right nympha. They were found to be clean cuts of a sharp instrument, about half an inch long, and the deepest an inch and a half in depth. They were recent, and the death had resulted from hæmorrhage. These were all clearly cases in which the nature, situation and extent of the wound must clearly proclaim the intent of the party. They also go to prove that where a highly vascular part is wounded by an incision, death may take place in a very short time from the hæmorrhage, although no large blood vessel be divided.

The direction of the wound may also be an important circumstance to show the intent. This question arose in the case of Campbell, who was tried in 1831, for shooting a man who came to his house at night under suspicious circumstances. See Watson, 246. The defence was that the ground being rough and slippery, the prisoner stumbled, and both barrels of the gun had gone off by accident. This account of the matter was confirmed by tracing the direction of the shot in the body of the deceased, which was found to be slanting upwards.

2. We must also look at the nature of the weapon employed, and the manner in which the death was occasioned. Although every weapon, down to the fist, by the use of which death is effected, is, in the eye of the law, a "lethal weapon," yet with a view to collect the intent, it is obvious we are to have reference to the character of the weapon, and its agency in producing immediate death. A person must be held to intend the production of such a result, as the means employed would justify any rational being in infering must be produced by them. Hence the use of fire-arms, a sword, an axe, or any other such kind of weapon, in such a manner as evidences a design to take life, affords a very clear inference that such was the original intention.

But where the fist only was used or a slight walking cane, or some other slender weapon, and the wound has proved fatal, the intent to produce such a result may well be doubted, unless it is proven from other circumstances. A repetition of the blows, however, may be evidence of the malicious intent, or it may be established from other circumstances. A single wound, or a number of them, inflicted by repeated efforts, would go to show the existence of malicious intent, as also would be the infliction of a wound in a cruel or atrocious manner; as in the case of a female related by Watson, page 194, who after becoming stupified by drink and mal-treatment, had sharp pieces of stone and hay thrust into the vagina and rectum by which she died in two or three days. And also in the case of Brown, the father, who held the deceased, while his son repeatedly struck him on the head with a stick of which he died; the father remarking "there is no wounding by rule, so as to pay well and spare the life." *Watson*, 239.

But if the injury seemed at first to be only of a trivial nature, but afterwards, from some cause or other, proved to be fatal, the malicious intent could hardly be inferred. *Watson on Homicide*, 244–5.

4. The fourth general subject of enquiry is, as to the acts which indicate volition or locomotion, after the infliction of mortal wounds. It sometimes becomes important to determine what possible efforts can be made by an individual after the receipt of a mortal wound. Wherever this question has arisen, it has been generally in cases of injuries to the head, wounds of the heart, large blood vessels, diaphragm and bladder. Important inferences are sometimes sought to be drawn from the position in which a body is found, considered relatively with the supposed position of the murderer; without adverting to the possibility, or perhaps, probability, of the murdered person's having changed his position after receiving the mortal wound.

As the object in this enquiry is to arrive at the maximum, or utmost extent of effort, which is possible after the infliction of the severest wounds, it may be well briefly to mention a few cases which have occurred, in which this maximum seems the clearest to have been shown. A man fell from a scaffold on the summit of his head. He was at first stunned, but on reaching the hospital dismounted, and walked up stairs with but little assistance. He died in three days, remaining perfectly rational, and going to the water closet the day before his death. On examination afterwards, the skull was found split from the frontal bone backwards through the saggittal suture to the foramen magnum. In both hemispheres there was a large quantity of effused blood in a semi-coagulated state, more than two ounces being found at the base of the skull. *Taylor's Med. Juris.*, 297 – 8.

A boy fired a pistol which burst, and the breach of it disappeared, but it was supposed to have entered the brain. The boy remained sensible for two days, and even showed some signs of amendment, but finally died 24 days after the accident. On examination the brain was found much disorganized, and the breach of the pistol weighing nine drachms was found lying on the tentorium. *Taylor*, 298.

This question arose in a medico-legal case reported by Dr. Wallace. A man was found dead in a stable, with a severe fracture of the temporal bone, which had caused the rupture of the middle meningeal artery. A companion was accused of his murder, but alleged that the deceased had fallen from his horse the day previous and met with the accident. It appeared that after the fall, the deceased had gone into a public house and remained there sometime drinking, afterwards returning to the stables. The question was whether it was possible, after such an extensive fracture with extravasation of blood, for a man to do what the accused represented the deceased to have done. The medical witness denied its probability, but admitted that it was possible. The excitement of the drinking might in this case have increased the quantity of blood extravasated, which was the immediate cause of death. *Taylor*, 298.

Wounds of the heart have generally been considered as immediately fatal. This has not been found to be invariably the fact from experience. A man who had been stabbed in the right ventricle ran eighteen yards after having received the wound. He then fell and died in six hours. A punctured wound was found extending into the right ventricle in an obliquely transverse direction, dividing in its course the coronary artery. The pericardium was nearly filled with blood, and about four pounds were extravasated on the left side of the thorax. *Watson*, 98.

In a case reported in the Medical Gazette, XIV, 344, a boy survived five weeks, employing himself during that time in various occupations, in the substance of whose heart, after his death, was found lodged a mass of wood. *Taylor*, 298.

This question has frequently arisen where some or all the great blood vessels of the neck have been injured. In one case a woman who had the right carotid artery and jugular vein, together with the trachea and œsophagus completely divided, was able afterwards and before death, to escape from the house where the deed was perpetrated into a garden at some distance, where the body was found lying. *Taylor*, 299.

In another, a man committed suicide while walking along Oxford-street, by cutting his throat with a razor. Immediately after inflicting the wound, he was observed to hold a handkerchief to his neck and run forwards. He ran about four yards from the spot where the wound was inflicted, and then fell dead on the pavement, the razor firmly grasped in his hand. The carotid artery and several of its branches, with the jugular vein on one side, together with the trachea, had been all cut through. *Taylor*, 301.

The particulars of a very extraordinary case are given in Taylor, 299–300, from which it appears that a woman, after being knocked down by a blow on the temple, and while down having her throat cut in such a horrid manner as to divide the trunk of the carotid artery, and all the principal branches of the external carotid, with the jugulars, was nevertheless able, after that, to get up, leave the hovel in which the act was done, climb over a gate outside, and find her way to a distance of twenty-three yards, where the body was found.

It will readily occur to any one, that although the power of locomotion may remain after the division of the trachea, yet that all power of voice is entirely lost, and hence no calls for assistance can be made, at however short a distance the murder may be perpetrated. *Taylor's Med. Juris.*, 301.

In a case of rupture of the diaphragm, a man, in an intoxicated state, who was mal-treated by another, returned home walking two hours and died in 15 hours afterwards. On examination, a recent longitudinal rupture of the diaphragm was found extending about two inches and an half, through which the stomach had protruded. The question was when the rupture had taken place, and whether it was possible for the man to have walked for that space of time after its occurrence. The medical witnesses thought it improbable, but admitted the possibility of it. No other cause could be assigned than the mal-treatment. *Taylor*, 301.

There are also many cases where locomotion, to a considerable extent, has been exercised after ruptures of the bladder, and extravasation of urine. In one case a man, while intoxicated, was made sober by a blow on the lower part of the abdomen. *Taylor*, 301.

He felt cold immediately on receiving the blow, but walked home the distance of a quarter of a mile, although suffering great agony. He died four days after the accident. No ecchymosis was found on any part of the abdomen, but the bladder was ruptured in its upper and posterior portion about an inch in length. *Taylor*, 301.

In connection with this subject it should also be remarked, that although the infliction of a mortal wound may admit of subsequent acts of volition and locomotion, yet that it will not admit of struggling, and violent exertion, especially if accompanied with extensive hæmorrhage. In view of this fact, a medical witness may be called upon to determine whether a mortal wound, found on the deceased, was inflicted for the purpose of murder, or in self defence. This the following case will illustrate.

A woman was stabbed in the chest in an affray in Liverpool. The prisoner, the deceased, and two other females were quarrelling in the passage of the house. A struggle ensued between the prisoner and the deceased, which lasted about ten minutes. The defence was, that being attacked by several persons, he had stabbed the woman in self defence. The point to determine was, when the blow was struck; if, with premeditation, before the struggle, it would be murder; if during the struggle, it would only amount to manslaughter. The medical evidence showed that the blow could not have been struck before the struggle, because it was of a speedily mortal nature, and the deceased would not then have been able to struggle with the prisoner for ten minutes afterwards. In all medical probability, the deceased must have received the blow towards the conclusion of the quarrel, and it might, therefore, have been inflicted in self defence. The verdict was manslaughter. *Taylor*, 302 – 3.

5. The fifth general question regards the length of time that has elapsed since the wound was inflicted. The length of time that has occurred between the infliction of the wound and the time of the examination, is often a material subject of inquiry.

In the case of *The Queen* vs. *Raynon*, *tried in* 1841, the prisoner was charged with maliciously cutting and wounding the prosecutrix. There was a cut on his thumb, which he attempted to explain, by saying it was from an accident which occurred three weeks before. The medical testimony went to show that it could not have been done more than two or three days, which coincided in time with the murderous assault. This, and other circumstances, led to his conviction. *Taylor*, 293.

An incised wound, inflicted on the living body, has its successive stages of progress to the time it becomes healed. The first is the inflammatory stages when the edges of the wound begin to swell, which usually takes place in eight or ten hours from its infliction. Redness is exhibited and heat is developed, which is followed by the secretion of lymph, this liquid being poured out for about thirty-six or forty-eight hours. It is at first semi-transparent, but afterwards becomes thicker, more tenacious, and on the second or third day, white. It afterwards is penetrated with vessels, forms the connecting medium of the cicatrix, and becomes confounded with the tissues. The color of the cicatrix, in the first periods of its formation, is of a bright red; it afterwards grows paler, until it becomes whiter than the color of the skin.

The second is the purulent stage. Usually, on the third day, the secretion acquires a purulent character. As early as the fourth and fifth day, suppuration is fully established, and it lasts some five, six, or eight days.

The third stage is where cicatrization follows the purulent stage. This is commenced by a fibrous layer, which makes its appearance between the edges, and is at first soft, and easily broken down. This is complete about the twelfth or fifteenth day, when the wound is simple, of little depth, and only affecting parts endowed with great vitality.

The time occupied in these successive stages will depend considerably,

1. Upon the situation of the wound. Wounds of the lower extremities are longer in healing, than those on the upper part of the body.

2. On its extent. Where many different structures are involved, the wounds are longer in healing than when the skin and muscles are alone affected.

3. On the age and health of the wounded party. The processes, whether inflammatory, purulent, or of cicatrization, are slower the more diseased and infirm is the individual. *Taylor's Med. Juris.*, 293 ; *Watson on Hom.*, 19 – 20.

The form of the cicatrix varies with the wound. In incised wounds, it is generally straight and regular. When newly formed, it is red, vascular, injected with blood, and tender. At subsequent periods, it becomes smooth, white, and less tender. Where there is a loss of substance, or if it be a lacerated or contused wound, the cicatrix exhibits an irregular appearance, and the healing process is accomplished by granulation. The time here required may be five, six, or eight weeks, according to circumstances.

The doctrine of cicatrization is important to be understood, not alone in reference to ascertaining the time that has elapsed since the infliction of a wound, but also as a means of identifying both the living and the recently dead. They are among those permanent marks and indications that usually remain for a series of years, or during life. In reference to this, the enquiry may be made in this connection, whether a cicatrix, once formed, is ever removed, or so altered, as to have its character entirely changed.

In answer to this, it may be stated, that the tissue of which a cicatrix is formed, is different from that of the skin, being harder, less vascular, and destitute of the rete-mucosum, which it never again acquires. It has a peculiar whiteness, more particularly remarkable on the cicatrized skin of a negro. In those of lacerated and contused wounds, the form of the weapon is sometimes indicated. The true cicatrix, when so produced in the true skin, as to be easily perceptible, is looked upon as indelible, as undergoing by time no sensible alteration in form or character. *Taylor's Med. Juris.*, 294.

During the healing process, there is a contraction of the skin, which results in rendering the cicatrix of smaller size than the original wound. The wound itself is apparently smaller than the weapon, and the cicatrix still smaller than the wound. That formed at the exit aperture of a ball is larger and more irregular than that formed at its entrance. *Ib.*, 294-5.

There may be said to be still a fourth stage in the progress of wounds, viz., that of gangrene. This is the incipient stage of mortification, is attended with diminution of feeling, and livid discoloration. This never supervenes until at least fifty hours have elapsed after the infliction of the wound, unless in the case of very old persons, where it may occur earlier. It should also be remembered that putrefaction commences sooner in a wound than in any other part, but its effects must not be confounded with gangrene. Appearances on other parts of the body will be likely to afford indications by which it is easy to tell whether putrefaction has commenced or not. *Taylor's Med. Juris.*, 295.

A case occurred in which it became necessary to determine whether contusions on the body were all produced only a few hours before death, or for some time previous. The prisoner alleged that he had struck the deceased, his wife, but once, and that but a few hours before her death. The medical testimony went to show, that there were some rings of color peculiar to a disappearing ecchymosis, in some of the spots, while in others there were not, proving that the deceased had received more blows than one, and that some of these had been struck several days before her death. This was corroborated by other evidence. *Taylor's Med. Juris.*, 295.

Although the history of ecchymosis has been formerly adverted to, yet it may be well here to remark, that twenty-four or thirty-six hours usually elapses before changes of color appear; that the livid circumference gradually passes into a green circle; this, in its turn, becoming gradually diffused into a wide straw yellow band, completely encircling the ecchymosis; that the dark livid color slowly disappears from the circumference to the centre in four, five, or six days, while the colored bands spread more widely around; that a central dark spot is perceptible after ten days or a fortnight, and that, in the case of a very extensive ecchymosis, some weeks usually elapse before all traces of it are lost. *Taylor's Med. Juris.*, 295.

6. The sixth question we propose to discuss is—Was the wound the direct cause of death? The requirements of the law render it necessary to answer this question. In order that a person can be convicted of murder or manslaughter, it is necessary that the individual should die of the injury inflicted. The law can indulge in no speculation on the subject. It requires that the death should be clearly traced to the injury, and unequivocally shown to have been caused by it. In a combat between two, one receives a wound which may, or may not, prove mortal, and is left upon the field. Subsequently he is attacked by ruffians, who strip and rob him and beat out his brains. No indictment in such case would lie against the first assailant, because the deceased dies by the hand of others, and not of the wound inflicted in the first combat. The following case, reported in 2 *Beck*, 74, will serve as an illustration. In 1808, some drovers had a quarrel at an inn in France. In the course of it, one of the party was wounded with a knife on the face, hand and upper part of the thorax, near the right clavicle. The injuries were found on examination to be superficial and slight. The wounded man having washed himself soon after, started for his home. He was found dead the next morning bathed in blood. The left lung and pulmonary artery were found cut. The medical witnesses swore that this last was the cause of death, and that it must have been inflicted after the superficial wound upon the thorax, which was not bloody, but surrounded by ecchymosis. The fact was, that on his way home he was robbed and murdered.

If a person of a weakly habit, receives a wound of which he afterwards becomes cured; but owing to the long confinement he has been made to suffer, he is taken ill of a consumption, or some other malady incident to such a state of weakness, and dies of this consumption or malady; no charge of homicide could be sustained, as the death is directly attributable, not to the wound, but to the consumption or other malady, which might, or might not, have supervened, had no wound rendered the confinement necessary.

There must also be a certainty as to the cause of death. If the injury sustained be one only, among many causes, that have contributed to the fatal result, and the agency it has had in its production not very clearly ascertained, no conviction can be obtained. Thus in the case of William Duff and others, (*Watson*, 202,) who broke into a house and so affrighted a poor woman in child-bed, that she fell into a fever and died. The indictment was held not sustainable. So also in a case somewhat similar, where the prisoner broke into a house and so alarmed a woman recently delivered, as to be injurious to her health, and cause the death of the infant at her breast.

Where, however, the death is traceable directly to the injury, and has been clearly produced by it, no matter what may have been the situation or circumstances of the deceased, the prisoner is responsible. If the deceased were on his death-bed, and in the last stage of a mortal disease, still if he were shot through the head, or stabbed with a lethal weapon, in such a manner as to produce death sooner than it would have resulted from the disease, it is murder equally as if he had been in the vigor of health.

To avoid repetition the remainder of what might properly belong to this question will be discussed under the next, viz:

7. What are the circumstances that modify the medico-legal character of wounds, and that vary the liability of the inflictor? This is a very important enquiry, as it will be found to involve an investigation into the direct causes of death, as compared, in several instances, with those which are indirect.

1. The first circumstance to be mentioned, is the *interval of time* which elapses between the receipt of an injury, and the death of the individual. In some countries the law fixes a definite

period within which the individual must die of the injury, in order that a conviction for murder or manslaughter can be obtained. In Lombardy, for instance, the death must occur within a year, in England within a year and a day, in France within forty days, in Prussia within nine days. In Scotland there is no limitation, nor is there at present in the state of New-York, although the statute formerly prescribed six months as the requisite period. *Watson on Hom.*, 203.

In this state then, there is no obstacle in the way of connecting the death with the injury, however distant they may be separated from each other by lapse of time. In the majority of cases, wounds destroy life within two or three months after their infliction, but many times the fatal catastrophe is long delayed. A case is mentioned by Sir Astley Cooper of an individual, who died from the effects of an injury to the head received about two years previously, there having been during that whole period a continuance of the symptoms of cerebral disturbance. *Taylor's Med. Juris.*, 283.

Another case is mentioned, where a man died in consequence of a rupture of the liver, which occurred eight years before. Another very extraordinary case is stated, where a ball remained lodged in the left lung, during a period of twenty-five years, causing fits of suffocation and hæmoptysis, under which the individual at last sunk. The important point, in such protracted cases, is to connect the death with the infliction of the injury, in such a manner, as to show that the one has resulted from the other. If the wound be originally severe, or become so from its extent and long continuance, and if it keep on in a regular progression from bad to worse, so that the person wounded continually languishes, and is consumed by it as by a disease, the case differs not in reason or in law from the infliction of such a wound as would have produced death upon the spot.

The interval of time thus elapsing, may be important to the prisoner, in furnishing him with greater opportunities to urge exculpatory circumstances in his favor. Thus, there may have been improper conduct on the part of the injured party, or bad medical treatment, or the accession of some other disease, either of which, as we shall hereafter see, may form circumstances modifying the medico-legal character of wounds.

2. *Age*, as a modifying circumstance. There is a difference in the effect produced by wounds on persons of different ages. The least effect is generally produced on adults and persons of middle age. A greater strength and vigor both of mind and body, enable such to withstand the shock caused by severe injuries better than others. They are also less affected by their secondary results. The very young, and the very old, have far less vis vitæ, and are therefore much more easily affected by injuries. It is to be remarked, however, that fractures of the limbs are less dangerous, and more speedily cured, in young subjects than in adults.

3. *Constitutional peculiarities*, as a modifying circumstance. These may be,

1. *Malformation* or *transposition of parts*. These, in relation to important parts, are not of common occurrence. The possibility of them, however, is clearly established. Bichat relates a case as falling under his own observation, in which the stomach, the spleen, the sigmoid flexure of the colon, the point of the heart, the aorta, and the lung with two lobes, were all on the right side. The liver, the cœcum, the base of the heart, the vena cavæ, the vena asygos, and the lung with three lobes, were on the left side. All the organs placed beneath the middle line, as the mediastinum, the mesentery, the duodenum, the pancreas, the division of the trachæa, were reversed. The heart may be found on the right side of the thorax, the spleen in the place of the liver, the stomach descending into the umbilical region, and the bladder rising into the abdomen. In all such cases, where death results from an injury, and would not have so resulted had there been no transposition, unless the malicious or felonious intent is made out from other sources of evidence than what is derivable from the infliction of the wounds, the charge of murder cannot be sustained. The prisoner, so far as concerns any inference deducible from the act itself, of inflicting the injury, can only be held responsible for what would have been the result, had the parts had their usual, natural location Under this

view, it will devolve upon the medical witness to state what is the peculiar malformation or transposition in the given case; wherein it differs from the usual normal state; what precise effect is to be attributed to the injury in consequence of the deviation, and what would have been the result had no such malformation or transposition existed. Could the prisoner be proved to have known the fact of such malformation or transposition, it would then go to prove the malicious or felonious intent.

2. There may be a preternatural thinness of the cranium, unknown to the prisoner. Several cases of this kind are on record. A man caught a boy in the act of robbing an orchard, and struck him a blow on the head with a stick. This caused a fracture of the skull, and the boy subsequently died. A mere chastisement was intended, the stick being of so small a size, as not to have caused injury, under ordinary circumstances. The fatal result was owing to a preternatural thinness of the skull. *Guy*, 462.

A case somewhat similar occurred in Massachusetts. *Taylor*, 287. A blow was inflicted from a small stone, on the side of the head, of which the individual died in ten minutes. There was no fracture of the bones, or external bruise visible. The skull was found unusually thin, and the ventricles filled with coagulated blood, and all the vessels in a congested state. The same principle prevails here in regard to liability, as that just mentioned.

3. There may be a preternatural phlogistic, or hæmorrhagic diathesis. There are many cases of this kind upon record. The slightest wound, or abrasion of the skin, will cause alarming discharges. Even the scratch of the thumb nail, in the case mentioned by Metzger, produced death. 2 *Beck's Med. Juris.*, 185.

Many authorities are cited by Dr. Beck, (see *notes*, 2 *Beck*, 185,) which go to show, not only that this diathesis is liable to be hereditary, but that it is generally found to prevail in the male, and not in the female, line. The same principle must also prevail here in reference to liability in case of wounds or injuries, as that already mentioned.

4. Previous injury, or disease, as a modifying circumstance.

Under this head, many cases may present themselves involving no small amount of difficulty to the medical witness. It is really one of the most important topics that comes up for discussion in the whole range of Medical Jurisprudence. A person while laboring under the effects of an injury, or of some chronic disease, may be killed by a very slight blow, or even a sudden fit of passion. The question then arises as to the cause of death. Was it the disease or the blow? And would the blow have been sufficient without the disease? And did the blow accelerate the fatal result, which would otherwise have been unavoidable?

The law, as laid down by Lord Hale, is, that "it is sufficient to prove that the death of the party was accelerated by the malicious act of the prisoner, although the former labored under a mortal disease at the time of the accident."

The following principle, laid down by Starkie, will meet the case, where a knowledge of the peculiar state and condition of the deceased existed on the part of the prisoner: "It seems that in general, notwithstanding any facts which tend to excuse or alleviate the act of the prisoner, if it be proved that he was actuated by prepense and deliberate malice, and that the particular occasion and circumstances upon which he relies, were sought for, and taken advantage of, merely with a view to qualify actual malice, in pursuance of a preconceived scheme of destruction, the offence will amount to murder."

Several interesting cases will be found in the works upon Medical Jurisprudence, illustrative of this point. A gentleman was tried for the murder of his servant, killed by a blow on the loins. It was shown that the kidney of the deceased contained a calculus, the ragged points of which, by puncturing the blood vessels, had occasioned a fatal hæmorrhage. An acquittal followed upon the capital charge. *Guy*, 463:

The wife of a play-actor stabbed her husband in New-Orleans, in 1842, during a quarrel at the theatre. He died in about ten minutes, as it was supposed, from the effect of the wounds, one of which was on the right arm, and the other in the region of the stomach. The medical evidence showed that there was a considerable quantity of effused blood in the stomach, which was found to proceed from the rupture of a large aneurism of the abdominal aorta, the parieties of which were so much thinned, that the least excitement was sufficient to cause the accident. The prisoner was acquitted. *Guy*, 468.

A husband, on returning home one night, found his wife in a gin-shop, where she had been drinking and dancing. He struck her twice, and carried her home on his shoulders. A short time after, the husband described her as taking a fit, on account of which, he laid her in bed, and some of the neighbors coming in, found her to be dead. Sir Charles Bell found on the head, marks of several bruises. The skull was uninjured, but an extravasation of blood was found at the base of the brain, and into the ventricle. The anterior artery of the cerebrum was half torn across, and from this the extravasation had taken place.

Were the blows the cause of this rupture? Mr. Bell thought that such a shock was very likely to have caused it, because a slighter injury would probably have produced it in consequence of her state of intoxication, and the struggle she had with her husband, than would have been required in other circumstances. *Watson*, 214.

Cases of this kind, presenting peculiar difficulty, are those in which the symptoms and effects both of the previous disease, and of the injury, are similar, so that it is difficult or impossible to say which proved fatal. This class of cases may arise when injuries have been inflicted on the head or chest, where there already exists chronic disease of the brain and lungs. In such cases, enquire,

1. Was the injury sufficient to cause serious mischief in a healthy person, under ordinary circumstances? The answer to this question must depend upon an extensive knowledge of physiological principles; of the laws of life, and of the consequences of their invasion. These we shall not discuss here. There are cases, however, which have arisen under this inquiry, in which no doubt could be entertained. A slight injury, for instance, causes death by the rupture of an aneurism, or otherwise diseased blood vessel, or by that of a hernia, or diseased bowel.

Two men, having been at enmity with each other, accidentally met in the street, when one of them, while passing on horseback, struck the other across the shoulders with a whip. The man struck, immediately pursued the other, in a strong passion, but had hardly advanced a dozen steps, when he fell, uttered a few indistinct syllables, and died instantly. On examination, no outward mark of injury could be seen. It was subsequently found that an aneurism of the aorta had burst within the chest. *Watson*, 215.

In 1744, *Lydia Alden* was tried for the murder of her husband, by having kicked him in the groin. He had an inguinal rupture, and the injury proved fatal. *Watson*, 216.

Whether injuries inflicted on persons laboring, at the time, under serious disease, might, or might not, cause death in a healthy person, is often a very nice and difficult question. Where the injury was of such a character as to have proved fatal in a healthy person, not, at the time, afflicted with any weakness or disease, the existence of a previous ailment would not mitigate the nature of the crime. *Watson*, 216 – 17.

2. Did the injury, or the previous disease, occasion the death? This is frequently a very difficult question, more especially when the injury and the disease each produce the same symptoms and appearances. The occurrence of a violent passion, or a state of intoxication, may develope a previously latent disease, so as to cause apoplexy with extravasation; and at the time of such development, an injury may be inflicted on the head. Some cases illustrating this may be cited under the next enquiry. In such cases, it may be impossible to say which was the cause of the death. The disease and the injury may also act upon each other sympathetically.

3. Did the alleged previous disease really pre-exist, or was it the consequence of the injury? The greatest difficulty is likely to arise here where the injury and the disease affect the same organ, as the brain, lungs or alimentary canal. Fatal inflammatory action may have been going on for a considerable time unobserved previous to the injury, and when the effects of it become suddenly developed, simultaneously with the infliction of

the injury, there is often much difficulty in deciding to which of the two the result is attributable. The following case, reported in *Watson*, 218 – 19, will serve to illustrate.

David Kennoway was tried for parricide in 1825. The sister, on Sunday evening, left him at home in a state of intoxication, quarrelling and struggling with his father, an old man of seventy. Shortly after the prisoner followed her down stairs and went away. She immediately returned, having been absent about seven minutes, and found her father stretched dead upon the floor, with a slight wound upon the nose, and a severer one upon the forehead. She had left him apparently in good health. On opening the body there was found half a pint of red serosity in the ventricles of the brain, but no fracture of the skull, no extravasation of blood beneath it, no laceration of the brain. There was also an effusion of reddish serum in each pleural sac, but no other morbid appearances, in the chest or elsewhere.

The countenance was very black, which was incompatible with the supposition that the blows produced the result by causing a violent concussion of the brain ; as in cases of death from concussion the countenance is pale. After determining that it could not be the result of concussion, perhaps the next question that would present itself would be, whether the effusion was a vital one, or one of those pseudo-morbid appearances, which occur after death, and are apt to simulate the results of disease. The change was undoubtedly a vital one, no instance being known in which the vessels poured out so large a quantity of serum after death. The next question that arises is, was it the result of the injury and the struggle, or was it previously in existence, without producing any symptoms of disordered health ? It could not well have been the result of the injury and struggle, because if so, it would have been blood and not serum. The serum must be regarded as a sort of secretion or separation from the blood, and could not therefore be the sudden production of an injury. In connection with this, should also be taken into consideration the fact, that there was the same sort of bloody serum effused into the cavities of the pleura, which would seem to negative the conclusion that the effusion in the brain was the result of violence.

It is rendered pretty clear from all the facts and reasonings upon this subject, that the serum was effused previously to the injury. The difficulty then is to account for its existence unaccompanied by any symptom of disease. Mr. Watson supposes that the man had a latent hydrocephalic effusion, which proved suddenly fatal by the shock of the blow, or his struggles, or his violent passion. He cites some cases to prove this. *Watson on Hom.*, 219.

One was that of a young woman, who had complained, for four days, of some headache and occasional vomiting, but was able to go about. She was suddenly seized with ratling in the throat, and died unexpectedly in the full possession of her senses. On examination of the body, there was found in the ventricles of the brain, three ounces of serosity and a watery vesicle. Another case is mentioned by Dr. Abercrombie, very similar to that of Kennoway, except that the effusion was external to the brain. Morgagni has also mentioned a case of fatal pneumonia, where no less than eight ounces of serosity were found in the ventricles of the brain after death, without any corresponding symptoms during life, which must have been a case of true latent hydrocephalus.

"In the case of Kennoway, the surgeons attempted to get rid of all these difficulties by ascribing the effusion to the blows, and death to the effusion. But this is manifestly at variance with sound pathology. Kennoway was convicted of culpable homicide, and transported for life."

Several other cases are mentioned by Watson and others, but the one above stated presents features fully as important as any other under this head, and may, therefore, serve as its illustration.

5. Of subsequent injury or disease, as a modifying circumstance. This presents a class of cases, involving almost as much difficulty, as the immediately preceding. We have already seen, that the deceased must die of the injury inflicted, in order to sustain an indictment against the inflictor. This involves the

necessity of being able to trace the cause of death clearly to the injury. Sometimes a subsequent injury may be received to which the death is properly attributable. One Williams, of Glasgow, in 1833, received an injury which brought on a fever. He then received some severe blows, which caused gangrene of the fingers and arm, fever, delirium and death. *Watson*, 223.

The most difficult cases, however, are those in which the wounds become modified by the supervention of diseases which occur in their progress. These are the most commonly fever, erysipelas, inflammation, gangrene, hæmorrhage or tetanus. The intervention of any one of these, after the receipt of a severe wound, must render the case more or less doubtful and dangerous. If traced clearly to the wound as their cause, the accused will be held responsible, as they must then be regarded as the consequences of his own wrongful act.

Janet McLaren received an injury upon the head in July, 1823. The scalp was wounded, and the skull fractured and depressed, but there were no symptoms of any brain affection. An inflammatory fever supervened; and, several weeks after the injury of the head, violent inflammation of the chest came on and she died in two days after. *Watson*, 223. There were found three pounds of serous effusion mixed with flakes of lymph in the chest. The right lung adhered to the walls of the chest, and formed an abscess. There was also purulent matter in the substance of the lung. It was thought that the diseased states of the head and chest were each sufficient to have caused death, but that the latter appeared to be the immediate cause of it; the inflammation of the former being transferred to it. As both were traceable in a very direct manner to the injury, there was no doubt but that the wound was the cause of death.

The most difficult cases are those in which fever, erysipelas, and tetanus, supervene upon the reception of a wound. It is not easy to distinguish between fever which occurs as a consequence of the injury, and that which arises from other causes. But in case of an injury of the head, and the subsequent occurrence of fever, if lymph or pus is found effused on the membranes of the brain, the fever has most probably been the consequence of the injury, as this is frequently found in fever so caused. So also when erysipelas is caused by a wound, it generally begins around the wound itself. Reference should also be had to the prevalence or non-prevalence of these diseases at the time. *Watson*, 224.

"Fever with coma in a case of injury of the head, inflammation of the lungs with a wound of the chest, spontaneous rupture of an intestine where a blow had been inflicted, are cases which may be attended with much difficulty." *Watson*, 224.

An extremely difficult case for a decision is, where a slight wound is followed by tetanus. This disease is the most likely to supervene as a secondary consequence of lacerated or contused wounds which affect nervous or tendinous structures. It gives no warning of its approach, and may succeed very slight wounds. It may occur spontaneously, and may come on in consequence of exposure to cold and wet. When it is the result of a wound, it generally appears after about the third or fourth day. *Taylor*, 289.

Several cases have occurred and are reported, illustrating the supervention of tetanus. One is the case of *Mackenzie*, tried for the murder of *Clark*, in 1827, *Watson*, 208 – 9, in which a small, ragged, lacerated wound was inflicted upon the nose, and also some contused wounds upon the right elbow, and left hip joints. The injury took place on the 8th of January. Although somewhat unwell, he was enabled to be about his business some days. He died on the 19th. The report of the medical witnesses was, "that Clark's death had been occasioned by tetanus, which had supervened upon the injuries he had received on the 8th of January; and that, though this was an occasional, yet it was not a common or necessary consequence of wounds." The prisoner was found guilty of assault, but absolved from the charge of murder.

The case of Capt. Moir, tried in 1830, reported in Taylor, 290, was also an important one. The deceased had been a poacher upon the premises of the prisoner. He had furnished great provocation; and, on this occasion, the prisoner had rode back to his house, which he had left shortly before, and, having procured his pistols, fired at the deceased, and wounded him severely in the arm. The muscles, vessels and nerves were extensively lacerated. The deceased lingered for some time; tetanus supervened, under which he died. The medical evidence adduced on the trial, showed that death was caused by tetanus, brought on by the gun-shot wound inflicted by the prisoner. The prisoner was found guilty and executed. The connexion in this case was clearly traced between the disease and the injury inflicted. In all such cases, very important inferences may be drawn from the nature and character of the wound, and also from the instrument with which it is inflicted. A slight wound, inflicted with a trivial instrument, would go far to negative all malicious or felonious intent; whereas a severe wound, produced by a lethal weapon, or under circumstances implying malice, would go equally far to establish that intent which forms the gist of the crime.

6. The sixth and last modifying circumstance I shall mention, is misgovernment on the part of a wounded person, or his medical attendant—Malum Regimen. The difficulty here frequently consists in the inability to state how much of the fatal event is to be ascribed to the injury, and how much to the individual's own want of care, or to the inattention or improper treatment of the physician.

Mr. Watson properly considers this subject under three heads, the first of which is,

1. Was the want of assistance or attendance accidental, and inevitable, or was it intentional? In the former case, the prisoner is responsible; in the latter not. The question involved in that first mentioned, arose in the case of the *Queen vs. Thomas and others*, tried in 1841. *Guy*, 373. The deceased died from the effects of severe injury to the head, no medical assistance having been called. The judge said it was possible, that if he had had medical advice he might not have died; but whoever did a wrongful act must take the whole consequences of it. That it never could make any difference, whether the party injured had, or had not, the means, or the mind, to apply for medical advice. The prisoners were convicted.

"If, however, the neglect to call assistance is intentional; if it proceed from carelessness; or if a quack is employed, when a regular practitioner might have been had, and the person dies, the prisoner could not be considered responsible for the whole damage. This would form a valid plea of exculpation, or, at least, of mitigation of punishment."

2. Irregularities, or misgovernment, on the part of the patient. These may be of various kinds:

1. He may refuse to undergo the treatment prescribed:

2. He may be intemperate; may expose himself to cold or heat; or give himself up to the indulgence of inordinate passions. 2 *Beck*, 195.

Of all these, intemperance is perhaps the most common. In the case of *Turner*, reported in *Watson*, 228-9, a severe blow was inflicted towards the back of the right side of the chest, and several cuts on the head, by an earthen-ware dish, which fell from the top of a screen, and broke into fragments. He was seized, on the next evening, with great shivering, complaining of pain in his side and breast. He refused to apply to a physician, and continued to drink whiskey. He died on the 18th, three days after the injury. Externally, there were no marks of severe injury. Internally, serous effusion was found between the membranes of the brain, such as often exists in drunkards; about four ounces of sero-sanguineous fluid effused into the right side of the chest; the lungs adhering to the parieties at the lateral and middle part of the right side, by firm old membranous adhesions; the lobes on the right side adhering to each other by old appearing membranous adhesions; the lower and middle lobes much condensed, hepatised and fleshy; the color red, and air cells obliterated; the liver enlarged, hardened, uniform; the kidneys enlarged, the right one encysted. The injury on the right side of the chest appeared to be connected with the inflammation of the lungs which proved fatal.

In another case, originally reported by Dr. Christison, see *Watson*, 231, one prostitute, in a drunken revel, struck another with a smoothing-iron, inflicting a denuding wound of the skull. The wound never healed, and the woman constantly complained of headache. Eight weeks after the accident, she was attacked with erysipelas of the head and face, which ended fatally in ten days. An indolent ulcer occupied the seat of the wound, from the bottom of which, a small hole proceeded inwards, and perforated the bone. The woman, after the injury, kept up her old habit of getting intoxicated, even dancing with great spirit, and getting dead drunk at a ball, only a few days before the erysipelas began. She continued to lead the very kind of life which was calculated to induce serious consequences. The medical witnesses testified, that the death could not with any certainty be ascribed to the wound. The prisoner was convicted merely of an assault.

In addition to the irregularities or misgovernment referred to, it should also be mentioned, that the patient may conceal from the medical attendant some fact or circumstance, the knowledge of which may be important in the treatment of the case. Thus in the case put by *Watson*, 232. A medical attendant is called in a case where erysipelas has supervened in consequence of a wound of the scalp. The fact of the wound is concealed, and the case is treated as a spontaneous erysipelas. The person dies, perhaps from the neglect of having that method of treatment pursued, that would have been, had the physician known the fact of the injury.

3. There may be misgovernment on the part of the medical attendant, which may arise from ignorance, inattention, or mismanagement. This would form no exculpation if the wound was necessarily mortal, but it might, if it were simply dangerous. This ignorance, inattention, and mismanagement, may be manifested in a variety of ways, not necessary to be mentioned. One case will serve to illustrate this.

J. Bell was tried for the murder of *John Kerr*. He struck him a severe blow on the forehead, with a hoe, on the 20th of July. His death took place on the 28th. On the day after the injury, Kerr did not seem very ill, and was able to walk to his bed, having been admitted into the Royal Infirmary. On post-mortem examination, there was found, about an inch above the right orbit, and close to the mesial line, a circular, compound, comminuted, and depressed fracture of the middle part of the frontal bone, presenting the appearance of a shallow cup, of about half an inch in depth. The pericranium was in a sloughy state. The wound had suppurated. Internally there was purulent matter between the broken cranium and dura mater. Some spiculæ of bone were found attached to the dura mater; several of which had penetrated through it into the brain. There was also some purulent matter and lymph below the dura mater; and softening, with abscess, in the substance of the brain, about an inch deep at the seat of the injury. The medullary substance of the brain was inflamed, and had a yellow appearance to the extent of about an inch and a half around the abscess. The depressed portions of bone had not been removed. The death obviously occurred from inflammation of the brain, and the inflammation itself, was caused by the irritating action of the depressed portions of bone on the membranes and substance of the brain. Those portions should have been elevated and removed. This should have been done prior to any symptoms of inflammation or effusion having been developed. *Watson*, 236 – 7.

Lord Hale attempts to distinguish between death as it results from a wound rendered mortal by improper treatment, and death as it results from the improper treatment, irrespective of the wound. He thus lays down the rule. "It is sufficient to constitute murder, that the party dies of the wound given by the prisoner, although the wound was not originally mortal, but became so in consequence of negligence or unskilful treatment; but it is otherwise, where death arises not from the wound, but from unskilful applications or operations used for the purpose of curing it. *Guy*, 472.

In the case of surgical operations, the principles that should govern are ably set forth by Mr. Taylor. *Taylor*, 290 – 91. "Should an operation be unnecessarily and unskilfully performed, the responsibility of an agressor would, of course, cease, if the death of a wounded party could be clearly ascribed to it. Thus, if in carelessly bleeding a wounded person, the brachial artery should be laid open, or if in performing amputation, a large artery be imperfectly secured, so that the patient, in either case, die from hæmorrhage, the prisoner is not responsible, because it would be punishing him for an event depending on the unskilfulness of the medical practitioner. But if the bleeding or amputation is performed with all proper care and skill, and yet, in the one case, phlebitis, and in the other, tetanus, gangrene, or fever should destroy life, the prisoner will be differently situated. The practice of the law is strictly consistent with justice. If the operation be absolutely required for the treatment of a wound, if it be performed with ordinary skill, and still death ensue as a direct or indirect consequence, the prisoner will be held responsible for the result. It is presumed in these cases, that if the patient were left to himself, he would, in all probability, die from the effects of the wound. If, therefore, a surgeon, knowing that an operation would give a chance of saving life on such an occasion, did not perform it, it might be successfully contended in the defence, that the deceased had died, not from the wounds, but from the incompetency and neglect of his medical attendant; thence it follows, that if during this very necessary treatment, unforeseen, though not unusual causes, cut short life, no exculpation should be admissable, if it went to attack the best directed efforts made for the preservation of life."

8. What are the questions that arise in case of mayhem or maiming?

Mayhem was always an offence at common law. It was there defined to be a bodily hurt, whereby a man is rendered less able in fighting to defend himself or annoy his adversary. Therefore the cutting off, or disabling, or weakening a man's hand or finger, or striking out his eye, or fore-tooth, or depriving him of those parts, the loss of which in all animals abates their courage, are held to be mayhems. But the cutting off an ear, nose, or the like, would not, at common law, be mayhem, because the effect would be simply to disfigure, not to weaken. To render the act indictable it must be done maliciously. *United States' Criminal Law*, 509.

New-York, and most of the other states, have statute enactments upon this subject. In New-York it is enacted, that "every person, who, from premeditated design, evinced by lying in wait for the purpose, or in any other manner, or with intention to kill or commit felony; shall,

1. Cut out or disable the tongue; or,
2. Put out an eye; or,
3. Slit the lip, or slit or destroy the nose; or,
4. Cut off or disable any limb, or member of another, on purpose; upon conviction thereof, shall be imprisoned in a state prison, for such term as the court shall prescribe, not less than seven years. 2 *R. S.*, 664, § 27.

The statutes of other states make some difference both in defining the offence, and prescribing the punishment. Connecticut punishes the putting out of the eye or eyes of a person, so as to cause blindness, with imprisonment in the state prison for life; Delaware and North Carolina, the cutting off the genitals, with death.

9. How should the medico-legal examination of wounds be conducted?

A few practical suggestions are all that can here be offered under this head of enquiry. It is important, if possible, to examine a wound that presents externally, before the body has been removed from the position in which it was first found. The relations sustained by the body, and the wounds, with things external to them, can then, and then only, be properly ascertained.

After examining with reference to these relations, the next thing to be remarked is the kind of wound inflicted. Is it a contused wound or a lacerated, gun-shot, incised, or punctured wound? If either, what was the probable instrument by which it was inflicted? Is the form and impress of the instrument defined by the contusion, as is occasionally the fact? Can anything be collected from the lacerated, incised, or punctured wound, in reference to the instrument of its infliction? If it be a sword or gun-shot wound, are the entrance and exit holes clearly ascertainable? The existence of all foreign bodies should be carefully noted, and they should be preserved. The depth of the ball may serve to indicate the distance from which it was fired. The wadding has identified the murderer. In one case, half a ballad was found in it, and the other half in the pocket of the accused. The bullets should be preserved, to compare with fire-arms in the possession of the accused.

If the wound be incised or punctured, the quantity of hæmorrhage should be ascertained, with the view of determining whether it was inflicted during life. The bloodless state of the vessels is best ascertained by a reference to the organs of the abdomen, and also to the state of the brain. *Watson*, 381.

It should be observed whether there is a clot of blood over the cut surface, and also whether any signs of living action are observable. Any appearance of inflammation, of suppuration, or of gangrene, would be evidence of infliction during life. The length, breadth and depth of the wound, should be carefully ascertained. The external, or other parts of the wound, should not be destroyed. As far as possible, they should be kept entire. The custom observed in Paris is very admirable, and worthy of imitation; that is, to make a cast in plaster, of all wounds in cases where bodies are found divested of life by wounding, and preserve them in one particular place, called the Morgue, where they may ever afterwards be seen, and, if necessary, appealed to, for the purpose of discovering the murderer.

The external wound should be carefully compared with the internal injury, whether it be of blood vessels, nerves, bone, or viscera. Fractures require a careful examination, to determine whether they were produced before or after death. The seat of wounds should be described by actual measurement from known points; their figure and nature also carefully noted, and their direction ascertained with exactness. The latter may serve to show from what point the wound has been dealt.

The most approved mode of examining injuries is, if they be not situated over great cavities, to expose the successive layers of muscles in the manner of an ordinary dissection, observing carefully what injuries have been sustained by the parts successively exposed, before they are divided. *Watson*, 379.

All the great cavities should be examined, and every important organ in each, however distinctly the cause of death may seem to be indicated in one of them. *Ib.*, 375.

After examining the position of the body, things external to it should be noted; all the objects in its vicinity, with a view to discover on what it rested, or fell upon, or had been suspended from; all the marks of a struggle taking place near it; signs of the presence of a second party about the time of death, or after it; weapons or other objects, the property of the deceased, or of some other individual; all the remains of poisons, marks of vomiting, &c., that may be found near. To a shrewd and cautious observer, many indications of a character similar to the preceding, will present themselves.

III. POISONS.

This very extensive division of the second class, will be found to possess an importance second to none we have yet considered. That importance is increased, rather than diminished, by the fact, that it may be secretly administered, in the solitude and retiracy of the sick room, or amid the thousand occasions that are offered in the transactions of social and domestic life; and that its successful discovery, and complete disclosure, is attended with more or less of doubt and difficulty. Before bringing to view the several individual poisons, the effects of which are the most frequently made the subjects of investigation in courts of law, it will be proper and necessary to present some general considerations, which will be done in the following order:

1. The definition: What is a poison?
2. The law, and legal enactments in reference to its administration:
3. The art of secret poisoning, or of preparing poisons in such a manner that, in their effects, their poisonous quality shall be concealed:
4. The various methods by which poisons may become introduced into the system:
5. Their mode of action, when once introduced:
6. The various causes, or circumstances, which modify their action, with some hints relative to their treatment:

7. The general sources of evidence of the administration of poisons:

8. The most approved methods of medico-legal examination in case of poisoning:

9. The arrangement and classification of poison:

10. The consideration of the different classes, their orders or groups, and the substances composing them, or the individual poisons.

1. The definition: What is a poison?

The great number and variety of substances that come under the denomination of poisons, taken in connexion with the wide diversity that characterizes their action upon the human system, creates a difficulty in fixing upon any definition comprehensive enough to include the whole, and yet sufficiently distinctive to have an application to them, and to nothing else. There are substances which act mechanically, such as pins, needles, pounded glass, but which are not poisons. So, also, the same substance may, from some peculiarity of constitution, injuriously affect one person and not another. Such is not a poison. A large draught of cold water, taken into the stomach of a person heated by violent exercise, may prove suddenly destructive to life, but cannot be considered as a poison. So, also, hot water, taken into the system, may prove destructive, but is not poisonous. In view of all this, the definition given by *Dr. Guy*, 520, seems the most unexceptionable, viz., that "*a poison is any substance which, when applied to the body externally, or in any way introduced into the system, without acting mechanically, but by its own inherent qualities, is capable of destroying life.*"

2. The law, and legal enactments, in reference to its administration. If one resorts to poison, as an instrument to accomplish the destruction of life, it is equally murder, as if he had employed any other agency to effect the same purpose. Even where the person intended to be destroyed, does not take it, but one not intended does, and death is the result, the crime of murder is legally consummated, and morally too, as the intention was to destroy life.

This principle was established in *Saunders' case*. See *Plowden's*

Reports, 473. Saunders, intending to kill his wife, gave her a poisoned apple, which she, in ignorance of its true character, gave to his child, against whom he never meant any harm. The child died, and Saunders was convicted of murder. The perpetration of murder by means of poison was in England, anciently, punished more severely than the accomplishment of death by any other means. One was sentenced to be boiled to death. At one time, the offence was adjudged high treason. But subsequently, these distinctions in punishment were done away.

But the law not only punishes the use of poison which is successful in destroying life, but also the employment of it with the intent to destroy it, although the attempt may fail. The English statute (1 *Vict. c.*, 85,) enacts, "that whosoever shall administer to, or cause to be taken by, any person, any poison or other destructive thing, with intent to commit murder, shall be guilty of felony, and being convicted thereof, shall suffer death." *Guy*, 519.

The Revised Statutes of New-York enact, that "if any person shall be convicted of having administered, or of having caused and procured to be administered, any poison to any other human being, and which shall have been actually taken by such human being, whereof death shall not ensue, he shall be punished by imprisonment in a state prison for a term not less than ten years." 2 *R. S.*, 665.

So, also, it is made an offence to mingle poison with any food, drink, or medicine, with intent to kill or injure any human being; and wilfully to poison any spring, well, or reservoir of water; and to administer or expose any poisonous substance, so that it shall be taken by any horse, cattle, or sheep. 2 *R. S.*, 666, 689.

"If any physician, while in a state of intoxication, shall, without a design to effect death, administer any poison, drug or medicine, or do any other act to another person, which shall produce the death of such other, he shall be deemed guilty of manslaughter." 2 *R. S.*, 662.

If, under the same, or similar circumstances, a physician, or any other person, prescribes either of the above, and life is endangered, it is declared a misdemeanor.

In nearly or quite all the states, wilful attempts to destroy life by poison, although unsuccessful, are ranked among the higher crimes.

3. The art of secret poisoning, or of preparing poisons in such a manner, that, in their effects, their poisonous quality shall be concealed.

The history of this singular art will be found in 1 *Beekman's History of Inventions*, 74, *et seq.* Although it has once occupied a conspicuous place in history and Medical Jurisprudence, yet the investigation of it, at the present day, belongs rather to the curious than the useful. Under the term secret poisons, were understood to be included all those which can be administered imperceptibly, and which gradually terminate life like a lingering disease. The art of preparing and administering these poisons was known to the Greeks and Romans, particularly to the latter. It was much practiced in Rome, about 200 years B. C. About 150 ladies of the first families were convicted and punished for preparing and distributing poison. The art, however, was preserved; and we subsequently find the infamous Locusta, condemned to suffer death, but pardoned in order that she might be employed for state purposes. She afterwards prepared the poison with which Nero dispatched Britanicus, the son of Agrippina. The poisonous substances were derived from plants, particularly aconite, hemlock and poppy; or extracted from animals. The ancients seem not to have been acquainted with mineral poisons.

This dangerous art appears to have been carried to the greatest height in Italy, in the 17th century. The most infamous practicer of it was the celebrated Toffania, who first resided at Palermo. She prepared the *Aqua Tophania*, which she distributed by way of charity, to such wives as wished to have other husbands. From four to six grains were sufficient to destroy a man, and it was asserted that the dose could be so proportioned, as to operate in a certain time, such a number of days, weeks or months, for instance, after it was administered. This, without a knowledge of the constitution, and manner of living of her victims, would clearly have been impossible. She distributed her poison in small glass vials, labelled *Manna of St. Nicholas of Bari*, and ornamented with the image of the Saint.

She was at length seized and thrown into prison, where she acknowledged that she had caused the death of over 600 persons. She was afterwards strangled, and her body thrown, at night, into the area of the convent, from which she had been taken. This was to mitigate the arch bishop for invading the right of sanctuary.

This singular preparation was colorless, transparent and tasteless like water. Its poisonous quality was ascribed to arsenic, and it was said to be a solution of arsenic in aqua cymbalaria, the dose being from four to six grains. The symptoms as given by Hahnemann, see *Christison*, 296, were "a gradual sinking of the powers of life, without any violent symptom—a nameless feeling of illness, failure of the strength, slight feverishness, want of sleep, lividity of the countenance, and an aversion to food and drink, and all the other enjoyments of life. Dropsy closes the scene, along with black, miliary eruptions and convulsions, or colliquative perspiration and purging."

In 1659, it was observed at Rome, that many young married women were left widows, and that many husbands died when they became disagreeable to their wives. It was at length discovered that the mischief proceeded from a society of young married women, whose president, a little old woman, pretended to foretell future events, and who had often predicted, very exactly, many deaths to persons who had cause to wish for them. The old lady's name was Hieronyma Spara. She was a Sicilian, and had acquired the art from Toffania, at Palermo. She, her assistant and three other women were hung.

This detestable art also excited great attention in France, about the year 1670. The principal agent of destruction, through its practice, was the Marchioness de Brinvillier, a young and beautiful female, whose outward attractions concealed a heart of most uncommon atrocity.

She became the intimate of one Godin de Sainte Croix, who, while confined in the Bastile, learned of one Exili, an Italian, the art of preparing secret poison. This art, after his liberation, he communicated to the marchioness; who, assuming the garb of a nun, distributed food to the poor, and nursed and gave medicines to the sick in the Hotel Dieu, for the sole purpose of trying the strength of her different poisons. She was so successful that it was said, in Paris, that no young physician, in introducing himself to practice, had ever so speedily filled a church yard as Brinvillier. She caused her father and brother to be poisoned, and endeavored in the same way, but without success, to destroy her sister.

Sainte Croix was, at length, found dead in his laboratory; the glass mask, which he always wore while preparing his poisons, having accidentally dropped off, he became suffocated. In his possession was found a small box, to which was affixed a written request, that, after his death, it might be delivered to the Marchioness Brinvillier; or if she should not be living, that it should be burnt. The authorities did neither, but opened it, and found it to contain an abundance of poisons of every kind, with labels on each, describing their effects, as proved by experiments made on animals. The Marchioness endeavored to obtain possession of the box, by bribing the officers of justice, but finally failing in all her attempts, she left France. She was subsequently taken by stratagem from a convent, whither she had fled for protection and conveyed to Paris. She was there tried, convicted, beheaded and afterwards burnt.

The execution of the Marchioness did not suppress the practice. Both in high and low life, there continued to occur occasional instances of secret poisoning. These were so frequent that in 1679, a court called the *Chambre de poison*, or *Chamber Ardente*, was organized, charged with the special duty of watching, searching after, and punishing poisoners. Two women, La Vigoreux and La Voisin, were detected by it in carrying on a great traffic in poisons. Besides selling secret poison they distributed philtres, thus not only ridding women of bad husbands but also recovering lost lovers. On the 22d of February, 1680, they were burnt alive, after their hands had been bored through with a red hot iron and cut off. There were also several other executions by the common hangman.

Difficulties have always existed in obtaining an accurate knowledge of the composition of secret poisons. Governments have endeavored to conceal the recipes at the time of the criminal procedures.

In France they were burnt, together with the criminals. At Rome, Pope Alexander VII., caused them to be shut up in the Castle of St. Angelo. It is therefore, to some extent, a matter of conjecture, what were the component parts of these secret poisons. In the casket of Sainte Croix were found sublimate, opium, regulus of antimony, and vitriol. Besides these, a large quantity of poison was found ready prepared, the principal ingredients of which, the physicians were unable to distinguish.

The poisons prepared, both by Toffania and Brinvillier, were in all probability, arsenical mixtures, or arsenical neutral salts. The symptoms, such as loss of appetite, faintness, gnawing pains in the stomach, loss of strength without any visible cause, a continual indisposition, followed by a wasting of the lungs, a slow fever, &c.; all appear to indicate the action of that dangerous poison. There may, however, have been different kinds of poisonous preparations, as opium and cantharides have been, by many, supposed to have been the principal ingredients.

There now exists little apprehension of secret poisoning, in the sense in which that term has been understood. The great extension of medical and chemical knowledge, has tended both to unveil the true nature and composition of the secret poison, and also to destroy those sources of credulity in which it found so strong a hold, to exercise a power and influence over the imaginations of men. It has, therefore, ceased to be of much importance, except as a curious page in the history of man and of Medical Jurisprudence.

4. The methods by which poisons may become introduced into the system.

These methods are various, but require simply a brief enumeration. The most usual mode of finding their way into the system, is by the mouth and œsophagus. Where large quantities are required to produce the proper effect, it may be doubtful whether any other avenue may be sufficient. Those of the more active kind, and such as are easily volatilized, may be introduced through the nose, in the form of odors. The process of inspiration may introduce them through the lungs. They may also be injected into the rectum, in the form of injection. They may be introduced directly into the circulating system, by opening and inserting them into a blood vessel. It is also asserted by some, although it is denied by others, that in some instances they may find their way through the skin by the process of absorption. 2 *Beck's*, 240.

In whatever way they may be introduced, the next enquiry is

5. As to their mode of action.

This is of two kinds *local* and *remote.*

Of the local mode of action, there are three varieties.

1. *Corrosion.* This is a chemical decomposition of the tissue to which the poisonous substance is applied. A familiar instance of this may be found in the concentrated mineral acids, which corrode and disorganize the textures with which they come in contact. The fixed alkalis have also a similar operation.

2. *Irritation.* This is a much less powerful effect than the preceding. Its immediate result, and the evidence of it, is *inflammation.* This is not only the *first*, but is also the *slightest* effect, produced by this class of substances. There are many instances of this variety. Alcohol reddens the stomach. The mineral acids in their diluted state, arsenic, nitre, cantharides, euphorbium, may all cause irritation, and consequent inflammation in the stomach and intestines. From the first, or inflammatory state, the part may pass into that of ulceration, and ultimately of gangrene, its severest effects. By inflammation, ulceration and gangrene, a breach may be made in the texture of the organ, but this is different from corrosion. These two effects may be produced in any tissue or organ of the body; as the skin, mucous membrane of the stomach and intestines, cellular tissue, serous membranes of the chest and abdomen, or in the muscular fibre. *Christison on Poisons*, 3.

3. *Nervous impressions.* These consist of peculiar impressions made on the sentient extremities of the nerves, which are unaccompanied by any visible change of structure. For instance, monkshood, when chewed, causes numbness and tingling in the lips and tongue; opium, applied to the inner coat of the intestines of a rabbit during life, immediately paralyzed their muscular contractions, without, for some time, affecting the general system. The prussic acid, applied to the hind leg of a frog, palsied it in thirty-five minutes, while the other hind leg continued perfectly sensible and irritable. These facts go clearly to show, that there may be local impressions of a purely nervous nature, without any perceptible organic change.

Remote action defines the power which certain poisonous substances possess, of affecting an organ remote from that to which they are applied. Thus cantharides irritates the organ with which it is brought into contact, and also affects remotely the urinary and generative organs. Morphine, applied to a wound, or thrown into the stomach, exercises a direct influence upon the brain. So, also, the strychnia tribe affect the spinal marrow. A distinction is taken, by some, in relation to the manner of action; a few appearing to have a common, but most poisons a specific action. Thus, the oxalic acid exerts a corrosive action upon the lining membrane of the stomach and bowels, exciting inflammation around the parts destroyed. The same constitutional shock attends the action of this acid, as accompanies all severe local injuries. Arsenic, taken into the stomach, irritates and inflames its lining membrane, and also causes cramps in the extremities; these being the usual attendants in all acute inflammations of the lining membrane of the stomach and bowels. When applied to the skin, or inhaled into the lungs, it also excites inflammation of the same lining membrane of the stomach, with which it does not come in contact. This shows, that the production of inflammation of this membrane, is its specific action.

The remote action of poisons naturally leads to the inquiry, as to the manner in which the poison is conveyed from one organ to another. Two channels present themselves. These are the bood vessels, and nerves. The conveyance by the first being by *absorption ;* that of the second, by *sympathy.*

1. In regard to the blood vessels, and their action by *absorption*, several facts go plainly to show, that many poisons act through the blood.

1. They disappear, during life, from the shut cavities into which they have been introduced. They are absorbed. Four ounces of a solution of oxalic acid were injected into the peritoneal sac of a cat, which was killed in fourteen minutes after; and yet, on opening it, although none of the poison had escaped by the wound, scarcely a drachm was found remaining. *Christison on Poisons.*, 9.

2. Many poisons are found to act with rapidity, when they are applied to a part which is attached to the body of arteries and veins only. This has been proved in regard to opium, to nux vomica, hydrocyanic acid, and diluted oxalic acid. Many poisons will not act, when they are applied to a part of which the circulation has been arrested, although the connection, by nerves, has been left with the body entire. The hydrocyanic acid, when introduced into the hind leg of an animal, after the abdominal aorta has been tied, will not act until the ligature is removed, and then acts with rapidity. *Ib.*, 9 – 10.

3. It has been clearly ascertained that there is a difference in the absorbing power of the different tissues. A poison introduced into a wound, or injected into a vein, is absorbed with the greatest degree of rapidity. The surface of serous membranes less rapidly absorbs; and that of the mucous membrane of the alimentary canal, exercises the least of all absorbent power.

No doubt can, therefore, remain, but that poisons are absorbed, and pass into the circulating system. But are they necessarily detected in that system, or in parts of the body remote from the place of their introduction? Some poisons have been discovered in the blood, and soft parts of the body. For instance, sal ammonia has been detected in the serum of horses ; camphor in the blood of the vena cavæ; copper in the liver, and lead in the liver, spinal cord, and muscles.

It is not often, however, that poisons can be detected in the blood, although they may have entered it.

1. The quantity of poison that enters it is so small, when compared with its entire mass, as to render it of difficult detection, after being distributed through the whole body.

2. The poison may have passed off with the excretions, during life, and thus have gone beyond the reach of analysis. Iodine, for instance, passes off rapidly by the urine, and alcohol by the breath.

3. Some poisons are, in a short period of time, removed from the blood, and concentrated in particular organs. Where animals have been poisoned slowly, by small doses of the preparations of copper, no part of the body was found to contain any of the poison, except the liver. So, also, sugar of lead, administered in the same way, could be discovered no where else, except in the liver, muscles, and spinal cord. *Christison on Poisons*, 16.

4. The poison may be decomposed in the blood. Some obviously act upon that fluid, which implies that corresponding changes are effected in them. Nitric oxide gas gives the blood a chocolate color, and deprives it of its power of coagulating. Sulphuretted hydrogen and hydrocyanic acid effect obvious changes in the blood. Other poisons, in all probability, are decomposed in the blood. Eight and an half grains of oxalic acid were injected into the femoral vein of a dog, causing its death in thirty seconds. Here it was impossible that the poison could have passed off by the excretions, and yet not a particle could be detected in the blood after death. It must, therefore, have been decomposed by the blood. Many other poisons are destroyed in the same way.

2. In regard to the nerves, and their action by *sympathy*. Although all toxicologists seem fully agreed that poisons are absorbed, and are conveyed to the different organs by means of the circulation, yet there has ever failed to be an equal unanimity of opinion, in reference to their transference, by *sympathy*, through the medium of the nerves. The correct settlement of the question is of some importance practically, because, if absorption is

the only medium of diffusion, the use of ligatures, and cupping glasses, might always be resorted to with, at least, some prospect of success, wherever circumstances and opportunities favored the application.

The advocates of sympathy urge, that impressions, other than those of the external senses, are conveyed, from one organ to another, by means of the nerves; that acute inflammation of the stomach, for instance, proves fatal before death can result from the suspension of digestion; that severe wounds of the stomach may cause death, even before inflammation can commence; and that rupture, from over distention, may produce almost instant death, without any inflammation, or any material hæmorrhage. *Christison on Poisons*, 5, 6.

So also in the swallowing of corrosives, as the mineral acids, the fatal result follows in a short space of time, and the symptoms are imperceptible pulse, fainting and excessive weakness. These are not only identical with those that accompany injury from disease or violence, but are also such as show very clearly that remote organs are affected. Again, dilution of the concentrated mineral acids actually facilitates their more rapid absorption, but, at the same time, diminishes or entirely destroys, their remote action.

But the argument the most generally urged is, that some poisons produce so instantaneous an effect, as to preclude the possibility of their diffusion, through any other means, than a nervous agency. The hydrocyanic or prussic acid, for instance, acts with a celerity, which is compared by Magendie to the swiftness of a cannon ball, or thunderbolt. From some experiments made with the diluted acid, several dogs were brought under its influence in ten, eight, five and three seconds. One animal was killed outright in four seconds. *Christison*, 7. Strychnia has been known to commence acting in fifteen seconds. So also has alcohol on animals.

The answer to this is, that from recent experiments, it has been ascertained, that poisons are much more rapidly diffused, through the medium of the circulation, than was formerly supposed. From experiments made by Mr. Blake, see *Guy*, 525-6, it appears, that in the dog the time required for a poison to pass from the jugular vein to the lungs, was from four to six seconds; from the same vein to the coronary arteries of the heart seven seconds; from the same vein to the carotid artery, from five to seven seconds; and from the aorta to the capillaries, four seconds. Introduced into the jugular vein, it was distributed through the whole body in nine seconds. The time required for it to complete its circulation through the system of the horse, was from twelve to twenty seconds.

From these, and some other facts, Dr. Guy is of the opinion, that absorption and diffusion through the blood vessels, is the only method, by which, the poisons are transferred from one organ, or one part of the system, to another. The physiologist Müller was also of the belief, that all poisons entered the circulation before producing their injurious effects. To account for the rapid diffusion of the prussic acid, he supposed it possessed great volatility, and power of expansion; by which it was enabled to diffuse itself through the blood more rapidly than that fluid circulates; to permeate the animal tissues very quickly, and in a manner independent of its distribution by means of the blood; and thus to produce the peculiar material changes in the central organ of the nervous system more quickly in proportion as it is applied nearer to it. *Guy*, 527.

There are some facts, however, that are very difficult of explanation except upon the ground of diffusion by sympathy. "If the nose of a rabbit be introduced into a receiver filled with hydrocyanic acid vapor, the animal drops dead instantly." Animals have been seen to fall prostrate on being bit by a viper, and "others void their urine and excrements at the very instant, as if their spincters had become paralytic at the moment of their being bit." *Guy*, 527. The probability therefore is, that both absorption and sympathy are among the instrumentalities, by which, poisons are enabled to work out their injurious effects upon different organs or parts of the human system remote from the place of their introduction. When sympathy is the mode of action, if death is the result, it must be ascribed to the shock impressed on the general nervous system, from the contact of the poison with the nerves of the living tissues. *Taylor's Med. Juris.*, 27.

6. The causes, or circumstances, which modify the action of poisons. These are various, and may be briefly summed up in the following.

1. The *quantity* administered. Here, as a general rule, the larger the quantity, the more severe the effect produced. What is very remarkable, the effect, in some cases, varies with the difference in quantity. For instance, arsenic, in small doses, may cause inflammation of the stomach; in a large one, it may affect the action of the heart. Probably the most remarkable poison of this description is the oxalic acid. That, according to the dose given, may corrode the stomach, or act on the heart, or spine, or brain.

2. *The state of aggregation* in which it is administered. The general law is, that poisons act far more energetically, in a state of solution, than in the solid state. In the former state, they are more quickly diffused over a large surface, and are also better fitted for entering the bibulous vessels. Poisons must be dissolved, previous to being absorbed. In some cases, the mode of action is different when administered in the solid or liquid state. Camphor in the former state, generally causes inflammation of the stomach; in the latter, delirium, or tetanus, and coma. Some poisons act still more efficiently when reduced to a state of vapor. *Christison on Poisons*, 21.

3. *Chemical combination.* The effect of this varies with different poisonous substances. Those which possess a purely chemical action, like the alkalis and mineral acids, lose a part, or all, their active properties, when brought into combination with other substances. The resulting substance possesses new properties, being more or less active according to its solubility. All those poisonous substances, which possess a specific action, continue to exert it in their different combinations. The salts of morphia, for instance, all possess the same specification whatever be their combinations, the difference being only in degree. The same is true of strychnia, arsenious, hydrocyanic, and oxalic acids.

4. *Mixture.* The effect of this varies considerably with different poisons. So far as they are diluted by the mixture, their activity should be lessened, both because the quantity is smaller, and the time necessary for their absorption is prolonged. But if the poison is an irritant of a powerful character, and acts through the blood, a moderate dilution will enable it to enter the vessels more easily. This is particularly the case with the oxalic acid. Concentrated, it is feebly irritant or corrosive. Diluted, it speedily enters the blood and causes death.

There is another effect of mixture totally different, viz., that which arises from the fact, that by means of it, a mechanical impediment is thrown in the way of the poison's acting so directly upon the animal membranes. This is aptly illustrated by supposing arsenic to be taken at the same time that a meal of victuals is eaten. If the meal consists of solid food, the effects of the poison would be very slowly manifested. If taken with liquids, such as porridge, and still more if mixed with tea, beer or water, those effects would be developed much more rapidly. This furnishes a reason why many poisons, when taken with a meal, are much longer in producing their usual effects than when taken at any other time. They are also in general less dangerous, because, as in the case of arsenic, a small portion only touching the membrane of the stomach, may produce vomiting to such an extent, as to throw up the entire contents of the stomach including the poison also.

An indication is here furnished in regard to remedies. Finely powdered charcoal or magnesia, when taken in sufficient quantities, may so envelop the poison as to prevent it from exerting its hurtful effects. So also mucilaginous substances, freely administered, may afford relief upon the same principle. *Christison*, 22–3; *Guy*, 528–9.

5. *Difference of Tissues and Organ.* In the case of corrosive and irritants, a difference of tissue can cause no essential variation in their action. It is in those poisons which are absorbed, and act through the medium of the blood, that difference of tissue works a variation. The point in which the difference consists,

in reference to the speedy action of poisons, consists in the different absorbing powers of the tissues.

Poisons act the most speedily and energetically when injected into a vein. No obstacle is then presented to their immediate diffusion through the entire system, by means of the circulation. They also act about as speedily and effectively on the mucous membrane of the pulmonary air cells, and that whether introduced in a fluid or gaseous form.

The serous membranes possess great activity of absorption. Next to injection into a vein, or introduction into a wound, this tissue affords the most readily the means of introducing and circulating a poison through the system. Hence many poisons act much more rapidly through the peritoneum, than they do through the stomach.

The mucous membrane of the stomach and intestines, next to the serous, affords the most rapidly absorbing surface. The power of the cellular tissue to absorb, has never been very clearly ascertained.

The cutaneous absorption of poisons is always slow. The cuticle and intricate capillaries of the true skin, present many obstacles in the way of a rapid absorption. Some have even denied that poisons can be absorbed through the unbroken skin. It is a fact, however, that most gaseous poisons, and some solid ones, when volatilized, will act when simply placed in contact with the skin.

In regard to nervous tissue, there are many active poisons, being all of the narcotic class, that appear to act on the sentient extremities of the nerves, and indirectly, through the nerves, upon the brain and spinal marrow. It is a curious fact, that not one of these acts at all on the cut surface of the brain or nerves, or upon any part of the course of the nerves. *Christison*, 24 – 5.

6. *Habit.* So far as this has any effect, it is generally to lessen the action of poisons. The system, from having become habituated to their action, grows less and less affected by them. This has a more special application to the narcotic class, where the poison is specific, and acts by virtue of its own inherent peculiar qualities. The two poisons, in regard to which the power

of habit is the most frequently exercised, are opium and alcohol. The opium eaters and the intemperate, sometimes astonish us by the mighty power which habit comes to possess in them. This is probably owing to the rapid decomposition of the poison in some of the tissues. The stomach acquires an increased power of decomposing the poison, in much the same manner, as it acquires an increased facility in digesting some substances at first indigestible. All those poisons, however, to which the system can become habituated, produce in the end extremely injurious effects upon it.

Many of the inorganic poisons, particularly the corrosives, remain little affected by the force of habit. Those that enter the blood, are supposed to have their activity rather increased than diminished by this force. The effects of cumulative poisons, or those which are capable of gradually accumulating in the system, and of ultimately producing their injurious effects, ought not to be considered as acting under the dominion of habit.

7. *Idiosyncrasy.* By this term is understood that peculiarity of constitution, which subjects the organism to be affected by the action of agents, in a different manner, or in a different degree from others. Both this and habit, enter as a disturbing force, into the ordinary normal effects of poison, and the extent of the variety they are enabled to produce, should be capable of being fully appreciated by the medical jurist. Idiosyncrasy may operate in three different ways.

1. It may render less or more affected than others through the action of the same agent. A few grains of mercury may salivate one man, without in any perceptible degree, affecting another. So also, it is perfectly well known, that alcohol, in the same quantities, produces extremely different effects in degree, in its action upon different systems. So also the same quantities of arsenic will produce different effects upon different constitutions, and that entirely irrespective of any diseased affection.

2. It is possible for a substance, which ordinarily produces the same effect upon individuals, to produce in one, having a peculiar idiosyncrasy, a very different one. Thus Epsom salts have

been known to act like opium, and opium to have a purgative effect. *Guy*, 530.

3. Owing to this same peculiarity, some substances are actually poisonous to some individuals, which, to the generality of mankind are not only harmless, but even nutritious. Different kinds of fish act upon some in the manner of poisons, producing fainting, sickness, pain of the stomach, and sometimes attended with dangerous consequences. The same has also occurred in the case of mushrooms. There are probably few articles of food, in regard to which, such idiosyncrasies may not, in a few rare instances, be met with. *Christison on Poisons*, 28.

8. *Disease.* This, like habit, tends in general to impair the activity of poisons; the system being rendered by it less susceptible of being influenced by them. The extent, as well as the degree of influence, depends much upon the kind and nature of the poison, and also upon the character and severity of the disease. The poisons chiefly influenced are from the organic kingdoms. They belong principally to the narcotic class. Those from the inorganic kingdom are much less affected.

So also much depends on the disease. In severe dysentery and cholera, the susceptibility of the system to be influenced by opium is very much diminished. One reason may be, that the poison is then carried with great rapidity through the alimentary canal. So also when the system is laboring under great weakness, the power of absorption is much diminished; and hence the poison is not taken up with the usual quickness by the absorbent vessels. There are perhaps no diseases that impair, more powerfully, the activity of poisons, than tetanus and the more active forms of mania. In both these, the nervous system is in a state of peculiar excitement, by means of which, the ordinary action of the poison is, to a great extent, counteracted.

There are a few diseases which increase the susceptibility of the system to the action of poisons. This occurs whenever the poison and the disease both tend to bring on the same pathological state of the system, or of any particular organ. Thus, in cases where apoplexy has actually supervened or is threatened, opium administered produces a much more powerful effect. So in case of inflammation of the alimentary canal, any irritating substance may produce a dangerous impression. *Christison*, 31.

It ought to be here remarked, that sleep has a strong effect in delaying the action of poisons. All the organic functions are then carried on more slowly, and there is, therefore, less susceptibility in the system, to be influenced by the action of those agents. Hence, when sleep either supervenes, or is produced immediately upon the taking of a poison, the ordinary effects of it may be expected to be delayed. *Guy*, 530.

As the duties of the medical jurist may be said to be accomplished when he has ascertained the fact of the existence of a poison, and has rendered clear to others the evidence upon which it rests, very little time can be occupied in remarks upon the treatment in case of poisoning.

Antidotes are given with two views: One is, to alter the chemical nature of the poison, and thus deprive it of its deleterious quality, before it comes within its sphere of action; the other is, to excite a contrary action in the system, and thus to control its poisonous action after it has begun.

An instance of the first, is the neutralization of a mineral acid, by the administration of an alkali. In regard to the second, we have little knowledge of any substances that are capable of acting as counter-poisons, or in any way to excite a contrary action in the system, and thus to control the poisonous action after it has begun.

The following are the antidotes, as enumerated by Christison, in his work on poisons, 33: When given in time, magnesia or chalk is a complete antidote for the mineral acids, and oxalic acid; albumen for corrosive sublimate and verdigris; bark for tartar emetic; common salt for lunar caustic; sulphate of soda or magnesia for sugar of lead; muriate of baryta, chloride of lime, or soda, for liver of sulphur; vinegar or oil, for the fixed alkalis; and these substances act either by neutralizing the corrosive power of the poison, or by forming with it an insoluble compound.

Where a poison has not been taken into the stomach, but some external application has been made of it, the object is, to prevent its entering the blood, or to remove it from the local vessels into which it has found entrance. One mode of doing this, is to apply cupping-glasses to the part where the poison has been introduced. This may prevent its further absorption, and suck the blood out of the wound, washing the poison away with it.

Another method, is to check the circulation by the application of a ligature. By the gradual tightening and loosening of it, the poison may sometimes be so gradually introduced into the general system, as to be productive of little or no injury. It has also been proposed to withdraw as much as possible of the blood below the ligature, for the purpose of extracting the poison; or as much of it as can readily be done, together with the blood. *Christison on Poisons*, 34–5.

7. The general sources of evidence of the administration of poisons.

Under this head is embraced a reference to those sources of evidence, which may be appealed to in all suspected cases of general poisoning, no regard being had to any particular poison given. The object is, to render the general fact of poisoning possible, probable, or certain; or improbable, or impossible.

These sources of evidence are five in number, viz: 1. The symptoms developed; 2. The appearances presented on a post-mortem examination; 3. Chemical analysis; 4. Experiments on animals; and, 5. Moral circumstances. Of these in their order,

1. *The symptoms.* These were formerly much relied on as evidence of general poisoning. They are not now regarded as furnishing anything more than a high probability. There are certain peculiar features of the symptoms that are to be regarded. These have reference—

1. *To the suddenness of their occurrence.* The symptoms developed by the more active poisons, whether irritants or narcotics, are extremely sudden; some are instantaneous, and most of them occur within an hour after the poison has been taken. But the most violent may be so administered in small doses, as to cause the symptoms to be developed slowly. Even corrosive sublimate may be so administered, as to cause at first only a mild salivation. In criminal cases which arise for investigation

in courts of justice, the more active poisons are commonly given, and the dose administered is very large; so that the fact generally remains true, that the symptoms are sudden in their occurrence.

2. The second feature to be noticed, is *the regularity in their increase.* This feature cannot be universal. Where the poisoning is by repeated small doses, there will be remissions and exacerbations, the same as in natural diseases. Some poisons admit of exacerbations and remissions, even when given in one large dose, while others produce violent symptoms in frequent paroxysms. Of these latter, the strychnia tribe afford instances. In poisoning with arsenic, after the first five or six hours, there is often a remission, and a subsequent return with increased violence. *Christison*, 42.

It is, nevertheless, generally true, that the symptoms of poisoning are steady in their progress.

3. The third feature is *uniformity in their nature.* This, although stated as a general characteristic, is nevertheless true in the case of but comparatively few poisons. Many poisons cause very different symptoms at the close, from what they do at the beginning. The first symptoms of arsenic, may be inflammation of the alimentary canal; afterwards, palsy or epilepsy. Nux vomica may excite, at first, violent tetanus; afterwards, inflammation of the stomach and bowels. Even the fact of change is sometimes cited as evidence of poisoning. Although, therefore, the presence of this feature generally adds little, if any weight, to the evidence in favor of death by poison; yet its absence may sometimes afford even positive proof in favor of natural death. Changes may occur in the symptoms, during their progress, that may be incompatible with the known effects of poison, and capable of being accounted for only on the supposition of natural disease. *Christison*, 46.

4. The fourth feature is, that *the symptoms begin soon after a meal.* Although poisons, as mushrooms, may remain for a long time in the alimentary canal before their effects commence, yet the more common poisons, such as arsenic, corrosive sublimate, the mineral acids, oxalic acid, nux vomica, and some others, be-

gin to develope their symptoms soon after they have been taken. It must, however, be borne in mind, that poisons may be introduced into the system through other avenues than the œsophagus and stomach. So, also, there are causes that may delay, for some time, the action of poisons. One of these is certain diseases, as already mentioned; another is sleep, occurring immediately or soon after taking the poison. This should always be taken into consideration, in connexion with the time intervening between the taking of a meal and the commencement of the symptoms.

5. The fifth, and last feature noticeable, is *the appearance of the symptoms during a state of perfect health.* This, although generally, is by no means universally, true. It has no application in case of slow poisoning. Poisons may also be administered to a person at the time diseased. The symptoms developed by the poison may be analogous to those produced by the disease, which would render the case extremely embarrassing. *Christison*, 44 – 5.

We have brought under review, briefly, the principal features of the symptoms which characterize general poisoning. It now remains to examine how far they are distinctive, or can be distinguished from those of natural disease.

1. *As to suddenness of occurrence.* This is also a peculiarity of many diseases. The plague, inflammation of the stomach, inflammation of the intestines, cholera, may, for the most part do, all develope their symptoms suddenly; generally running on speedily to a fatal termination. Diseases of the heart, and apoplexy, may also prove suddenly fatal, without previous warning. This feature, therefore, except what can be collected from particular poisons, cannot be regarded as distinctive.

2. The *regularity of increase* is also to be noticed in many diseases. Apoplexy, cholera, most acute diseases, when they prove rapidly fatal, are marked by a regularity in the increase of their sypmtoms.

3. In *their uniformity* they are hardly less distinctive. Many diseases are characterized by the same uniformity.

4. The *symptoms beginning soon after a meal.* This also occurs

in some diseases. Apoplexy is likely to take place after a hearty meal. So also is cholera, occurring from some causes. Distention of stomach, rupture of its coats, are likely to happen soon after an ingestion of food and drinks. As the diseases, however, that have this characteristic, are comparatively few in number, and of unfrequent occurrence, this feature is justly regarded as entitled to considerable weight.

It is not alone as *positive evidence*, that this feature is entitled to consideration. Its *negative force* is often greater than its positive; that is, where the symptoms are such as usually characterize the most active poisons, but their occurrence is so long after taking any food, drink, or medicine, as to exclude all reasonable probability that they could have been produced by the action of any poison which was taken with any such food, drink or medicine.

This was particularly exemplified in the case of the crown Prince of Sweden, which occurred in 1810. While reviewing his troops, he was observed suddenly to waver on his horse, and soon afterwards fell. He was immediately found insensible, and expired in half an hour. A rumor was circulated that he was poisoned. It appeared in proof, that he had taken nothing after he had breakfasted, which was about four hours previous to his falling from his horse. No other poison than an active narcotic could have caused the symptoms developed in the case, and such could only have produced them when given in a large dose. No poison of this character, could have had its effects suspended for four hours, and then have proved so suddenly fatal. It was undoubtedly an attack of apoplexy, of which he had already had some warnings, and of which some marks were found about the head after death. *Christison on Poisons*, 47–8.

The practice is sometimes resorted to, of substituting poisonous mixtures, for medicinal drafts or powder. In the case of Sir Theodosius Boughton, who was poisoned in 1781, by his brother-in-law, Donnellan, the most important evidence against the prisoner was the fact, that alarming symptoms came on in two minutes after the deceased had swallowed what was supposed to be a simple medical draught. Laurel water was substituted for the medicine.

5. *The symptoms first appearing while the body is in a state of perfect health.* Although almost all acute diseases commence during health, yet those of the inflammatory kind, seldom begin without some adequate and obvious natural cause.

From a careful review of every thing relating to symptoms, it is obvious, that the medical jurist cannot be justified in placing any very great reliance upon them alone in any case of suspected poisoning. They should by no means be neglected, as they may furnish the first hints of the cause of mischief. They may furnish evidence of probability, but not of certainty. They may demonstrate the impossibility of the poisoning. They may also furnish a necessary link, in the chain of proof, to determine whether the poison was the cause of death. In illustration of the last remark, Dr. Christison cites the case of Charles Munn, tried in 1824, for procuring abortion and of murder by poisoning. The evidence went to show, that arsenic had been given, under the effects of which, the deceased labored for twelve days. After that, she recovered, and in two weeks was free of every symptom, except weakness and pains in the hands and feet. She soon afterwards became affected with headache and sleeplessness, and died in nineteen days under symptoms of obscure general fever, but without any local inflammation. The medical witnesses in that case decided, that, admitting the first symptoms to be owing to arsenic, the death could not be ascribed to it with any degree of certainty.

2. The second source of evidence consists in *the appearances which present themselves on a post-mortem examination.* These also were formerly much relied upon, but with little reason. There are but very few poisons that leave any distinctive marks upon the organization. Dr. Christison thus briefly states his conclusions in reference to this source of evidence. "The appearances after death, which are really morbid, and which may be produced by poisons, are in one great class, the signs of inflammation of the alimentary canal in its progressive stages, in another class, the signs of congestion within the head, and in a

third, a combination of the effects of the two preceding classes; that neither set of appearances is invariably caused by the poisons which usually cause them; that congestion within the head is really seldom produced by those which are currently imagined to produce it; and that most of the appearances of both kinds are exactly similar to those left by many natural diseases." It is of little use here to dwell further on this source of evidence. It will be found, when we arrive at the mineral acids, that the corrosives, and some of the simply irritant poisons, leave distinct traces in the body, although sometimes not so easily distinguishable from those left by some natural diseases.

It was formerly supposed that unusual blackness or lividity of skin afforded a general indication of death by poisoning. A more enlarged experience has given to this a decided negative, and has also affirmed as true, that there is no difference in kind, between the lividity that succeeds death by poison, and that which follows death from disease.

Nor does early putrefaction, as was once supposed, follow death by poisoning. It is not generally caused by poisons, and in some cases, as in that of arsenic, the putrefactive process is delayed by the action of the poison.

It should be remarked, that post-mortem appearances may sometimes furnish negative evidence that may be valuable. Where, for instance, it is alleged that corrosives have been administered, the absence of all corrosion would serve to disprove the charge. So also the entire absence of all inflammation, in a case of alleged poison by irritants, would render doubtful or entirely disprove, the truth of the allegation.

If a poison is introduced into the body after death, with a view to inculpate an innocent person, the post-mortem appearances may become important. The absence of the peculiar appearances produced by the poison would, in such cases, frustrate the malicious purpose.

3. *Evidence from chemical analysis.* To this source of proof is justly attached a high degree of importance. Although its failure, for reasons which will presently be rendered apparent, cannot be received as evidence that no poison has been administered,

yet its clear detection of the poison, must always satisfy the affirmative enquiry. In order, however, to rest upon this evidence, the poison should be found either in the stomach, intestines or gullet; or in the matter vomited; or in articles of food, drink, or medicine, of which the sufferer has partaken; or in articles found in the possession of the prisoner, and unaccounted for.

The main enquiry should always be in relation to the cause of death. Although other apparent causes may develope themselves, yet this should not supercede the investigation of any suspicious substance, exhibiting the appearance of a poison. An interesting case is given by Dr. Christison, 55-6, quoted from Dr. Willdberg, of Rostock, of a girl, who actually expired, while her father was chastising her severely for stealing. Her death was supposed to have been the result of the beating, but, on the examination, although there were found the marks of many stripes on the arms, shoulders and back, with extravasated blood under them, yet they did not appear, by any means, sufficient to account for death. On opening the stomach it was found very much inflamed, and lined with a white powder which chemical analysis proved to be arsenic. The girl had taken arsenic through fear of her father's displeasure after being detected, had vomited during the flogging, and died in slight convulsions.

If, on the closest examination, no poison can be detected, it does not therefore follow that none has been administered. For,

1. It may have been discharged by vomiting and purging. In the case of Thom, tried in 1821, although the deceased had clearly died of poisoning by arsenic, yet none could be detected in the stomach or its contents. He had lived seven days, and all the time had labored under frequent vomiting. In another case, arsenic could not be found in the matter vomited twenty-four hours after it had been swallowed. In another case, a grocer died eight hours after swallowing an ounce of arsenic, and yet chemical analysis could detect none whatever in his body. It is nevertheless true, that poisonous substances not easily soluble, and which have been taken in a state of minute division, do adhere to the villous coat of the stomach with such strong tenacity,

as not to be easily dislodged by vomiting. Many instances of this have occurred in the case of arsenic. *Christison*, 56 – 7.

The length of time a poison, which has excited vomiting, may remain in the stomach, will depend on its solubility; the frequency of the vomiting; the remedies taken; and other similar circumstances.

2. The poison may have been absorbed, and may thus have disappeared. This is more especially the case where poisons are taken in a liquid form, particularly laudanum. It has taken place where solid opium has been taken. In a case of laudanum, which occurred in 1823, none could be detected, although the circumstances left no doubt but that it had been swallowed seven or eight hours before death. The readiness and celerity with which the absorption would take place, must depend much upon whether the poison was in a liquid form; or, if it was not, whether it was easily soluble. Some mistakes have been made in arriving at hasty conclusions that no poison has been taken, because none could be found in the stomach, which have occurred in consequence of overlooking its disappearance through the means of absorption.

3. Poisons may be decomposed, and hence not be found in the stomach or its contents. Many poisons are destroyed by the process of digestion. Some of the mineral poisons are also decomposed in the stomach. Among these are corrosive sublimate, lunar caustic, and hydrochlorate of tin. Their decomposition is owing to a chemical, not a vital process.

Other poisons become changed by entering into combination with other substances, without themselves undergoing decomposition. The decay of the body, prior to examination, may also have caused the disappearance of the poison. Where any considerable portion of time has elapsed between dissolution and the examination, "some poisons, such as oxalic acid, might be dissolved and then exude; others, such as the vegetable narcotics, will undergo putrefaction; and others still, such as prussic acid, are partly volatilized, partly decomposed, so as to be undistinguishable in the course of a few days only."

The results of experimental enquiries conducted by Orfila and

Lesueur were, that after a time the acids become neutralised by the ammonia disengaged during the decay of animal matter; that by the action of the animal matter the salts of mercury, antimony, copper, tin, gold, silver, and likewise the salts of the vegetable alkaloids, undergo chemical decomposition, in consequence of which the bases become less soluble in water, or altogether insoluble; that acids may be detected after several years interment, not always, however, in the free state; that the bases of the decomposed metallic salts may also be found after interment for several years; that arsenic, opium and cantharides undergo little change after a long interval of time, and are scarcely more difficult to discover in decayed, than in recent animal mixtures, but that hydrocyanic acid disappears very soon, so as to be undistinguishable in the course of a few days. *Christison on Poisons*, 61.

The discovery of poison, by means of the chemical tests, affords undoubtedly the clearest and most satisfactory evidence that can be obtained. Some have even gone so far as to insist that no case of poisoning should be considered as proven, unless the poison had been discovered by these tests. A case, however, is related by Dr. Christison, 62-3, in which although the tests failed to discover any, yet no doubt could really exist but that poison had been administered. A man, known to have some design on another, persuaded him to breakfast with him at a tavern. They had beef-steaks, fried potatoes, eels, claret and rum. Soon after commencing, the guest complained of feeling unwell, and began to vomit violently. This continued, with excruciating pain in the abdomen, long before a physician was procured. The physician, at first, imputed the whole to cholera, but on returning in the evening and finding him dead, said he had been poisoned. The body presented much external lividity, contraction of the fingers, great inflammation of the stomach and intestines, the appearance resembling that of gangrene. Some fluid was found in the stomach, but on analyzing it, no arsenic or other poison could be detected.

The attention was turned particularly to arsenic, as the prisoner was proved to have bought that poison, and to have made a solution of some white powder in his kitchen not long before the occurrence of this event. The deceased also presented symptoms of stupor, and other signs of derangement of the nervous system, remarked in rapid cases of poisoning with arsenic. Under all these circumstances, "the kind and character of the symptoms, their commencement during a meal, the rapidity of death, the signs of violent inflammation in the stomach after so short an illness, and the facility with which the absence of poison in the contents of the stomach may be accounted for, more especially if it be supposed that the poison was administered in solution," leave little doubt but that arsenic had been administered, most probably in solution, although none could be detected in the stomach or its contents.

4. *Experiments on Animals.*

The results obtained from this source of evidence are not often introduced in courts of justice. Several objections have been made to their introduction. It is objected

1. That what is poison to man is not always such to the lower animals. From the experiments of Orfila, it would seem, that the cat and dog are two animals generally affected by poisons in nearly the same way as man. And although poisons act on them, yet they do not act to the same extent, nor do all of them in the same manner. In general they act on them less violently than on man, but alcohol acts more powerfully. Opium, and some other poisons, produce different symptoms in man from what they do in animals. Most of the active poisons, however, produce nearly the same effects on all animals.

2. It is objected that it is difficult or impossible, to administer poison to animals in such a state of concentration, as to prevent it from being discharged by vomiting. To obviate this objection, it is directed to make a small opening into the gullet of the animal, having previously detached it from its surrounding connexions. All the liquid part is then introduced by a funnel thrust into the opening, and the solid portions made into little pellets are squeezed down. The gullet is then to be tied under the aperture. All this can only be done successfully by a practiced operator.

3. When the experiment is to be made of the vomited matter or contents of the stomach, it is objected that the poison may have been, either in part or wholly, vomited before hand or absorbed, or transmitted into the intestines, or decomposed by the process of digestion. Or that it may be so much diluted as to have no effect The validity or force to be attached to these objections will, of course, depend upon the circumstances of each particular case.

4. It is objected that animal fluids, secreted during disease, may occasionally act as poisons. Animal fluids are no doubt poisonous when putrid. The introduction of such fluids into an external wound, causes spreading inflammation of the cellular tissue. As to the effect of disease in rendering the contents of the stomach actually poisonous, there is one known fact going to prove it, which certainly demonstrates its possibility. Morgagni states, that in the case of a child that died of the tertian ague, an aruginous bile was found in the stomach, of so deleterious a character, that a little of it given with bread to a cock caused convulsions and death in a few minutes, and that a scalpel stained with it, and thrust into the flesh of two pigeons, killed them in the same manner.

On the whole, this will not be a source of evidence upon which can be placed a very great degree of reliance. It may be useful as a means of testing a suspected substance, and of determining whether it possessed poisonous qualities or not. So also it may be resorted to as a means of experimenting on different poisons, but usually, in medico-legal cases. When a sufficient quantity of suspected substance is found to subject to this test, it is also sufficient to subject to other and better tests.

5. *Moral circumstances.*

With these the skilled witness, as such, has nothing to do. There are, nevertheless, not unfrequently things connected with them, that do require his examination and testimony. All that can be necessary, therefore, is to state briefly the circumstances and the occasions where medical aid may be required.

1. The first circumstance relates to suspicious conduct on the part of the prisoner before the event; such as dabling with poi-

sons, conversing about them, and showing a knowledge of their properties. The medical witness may here be called upon to state the extent and accuracy of the knowledge, which the prisoner manifests by his acts and conversation.

2. Another circumstance relates to the purchase or possession of poison, at or about the time of the alleged crime, and the pretence under which it was procured, and whether the pretence turns out to be true or false.

3. The circumstances attending the administration of poison either in food, drink, medicine or otherwise. The great object, in case of any suspected administration, is to ascertain the *fact* and the *intent*. Two cases may be found in Dr. Christison, 75, which will serve to illustrate. The one occurred where the poison, arsenic, was contained in a bowl of porridge. A part of the meal, from which the porridge was made, was preserved. Another portion was obtained from the family stores. The former was shown by chemical analysis to contain arsenic, which the latter did not. There were also other circumstances going to show, that the poison must have been mixed with the meal in the morning, before any stranger entered the house. The accused was convicted.

The other case is cited from Barruel, and in that the arsenic was found mixed with a large mass of flour, of which only a small portion had been used in making bread. This was presumed to be accidental, the very large portion of flour, in which the mixture occurred, negativing the presumption of criminal intent. The wheat was, in all probability, intended for seed; and was sent by mistake to the mill, the arsenic having been mixed with it to destroy insects.

Where corrosive poisons have been used, the examination of the clothes has sometimes led to the conviction of the murderer. This has, at least, once occurred, in the case of poisoning with nitric acid. *Guy*, 537.

4. The intent of the person who is proved to have administered the poison. This will depend for its proof much upon the quantity given, and the circumstances under which it was administered.

In the trial of Hodgson, in 1824, for attempting to poison his wife, it was proved, that he had substituted corrosive sublimate for calomel and opium in pills, which had been prescribed by her physician. Also that a laudanum draught contained corrosive sublimate. These he attributed to mistakes and the first also to intoxication. In the latter case, he also alleged that he had mistaken for the water bottle, an injection of corrosive sublimate, which he had previously prepared for a sailor. The chemical analysis of the draught and the injection disproved the truth of this, by showing that the former contained fourteen grains to the ounce and the latter only five.

5. The simultaneous illness of other members of the family, besides the person chiefly affected. Where several persons have partaken of the same dish, and have been seized at the same time, with the same kind of symptoms, it affords strong evidence of general poisoning. The symptoms, however, must be characteristic of the action of some particular poison, in order to be justly attributable to it; otherwise the cause of the difficulty may be in the food itself. Where all who have eaten of a particular dish have suffered, and all who have not, have escaped, the moral evidence of poisoning is possessed of great strength. So also the several persons affected, may suffer in proportion to the quantity taken, by each, of a particular dish.

Thus, in the case of Lanargan, tried for the murder of O'Flaherty, it was proved that the daughter of the deceased, and two servants, were affected at the same time, and with the same symptoms as himself; that they had partaken of the same dish with him; that the severity of their several complaints was in proportion to the quantity each had taken; and that others of the family, who did not eat it, were not affected. *Christison on Poisons*, 85.

A very instructive case is recorded by Morgagni, of a clergyman who was traveling in company with another gentleman and two ladies. They had all dined together at an inn, and were about to resume their journey, when the clergyman was suddenly taken ill, with violent pain in the stomach and bowels; and soon after, with vomiting and purging. Of the rest of the company that had dined together, one of the ladies was similarly affected, but in a less degree; and likewise the other gentleman, though in a still less degree; but the other lady was not at all affected. It was found that this lady was the only one of the party, who had not tasted a dish of soup at the commencement of dinner. But the gentleman who had suffered least, had eaten the largest share of it, while the clergyman had taken less than either. But it was there the custom to use scraped cheese with soup, and it was ascertained that each had added cheese exactly in proportion to the extent of their illness. There was no difficulty, therefore, in deciding, that the poison was contained in the cheese; and after the recovery of the whole party, the landlord admitted that he had served up to his guests cheese that had been seasoned with arsenic to kill rats. *Christison on Poisons*, 85 – 6.

6. Another item of moral evidence consists in suspicious conduct on the part of the prisoner during the illness of the person poisoned. He may prevent medical advice being procured, or the relatives being sent for. He may attempt to destroy food or drink, or vomited matter, which may have contained the poison.

7. Suspicious conduct after the person's death, as hastening the funeral, preventing inspection of the body, giving a false account of the previous illness, and other things of a like character.

8. The personal circumstances and state of mind of the deceased; his death-bed declarations, and other particulars.

9. The fact that a motive or inducement exists on the part of the prisoner, such as his having had difficulties with the deceased, or a hatred of him, succeeding to property on his death, or being relieved of a burden by it, and other particulars of that character.

8. The most approved methods of medico-legal examination in case of poisoning.

Where a suspicion is created that a case of poisoning has occurred, several important points are to be attended to:

1. In reference to the symptoms. When did they commence? In what state or condition of the system? How long after a meal,

or the taking of food or medicine? What was the nature of the symptoms? What the order of their occurrence? Have they been uniformly progressive, or attended with exacerbations?

2. In reference to the matter vomited, or passed by stool. What is its character, its quantity, its color? Was there any sense of acridity or burning in the throat or mouth, previous or subsequent to the vomiting?

3. In reference to the dishes used at the previous meal. In what manner were they prepared? What was the nature of all the different articles of food used at the meal? If several persons have partaken of it, what articles have been taken by those who have suffered, and by those who have escaped, and in what quantities? Had the same articles of food been previously taken, without any bad effects, by the parties attacked? If more than one person partook of the meal, how many, and were they all affected, and how?

4. In case of the death of the patient, what was the exact time at which it occurred, and how long had he survived after the first appearance of the symptoms? What was the attitude and position of the body, the state of the dress, the surrounding objects? What bottles, paper packets, weapons, or spilled liquids are lying about? And if any, collect and preserve them.

5. In reference to a post-mortem examination. What are the external appearances of the body? Is the surface livid or pallid? What is the state of the countenance? Are there any marks of blood or violence on the person? Any discomposure of the dress? What is the temperature in the legs, arms, abdomen, mouth, or axillæ? Is there any rigidity, or cadaverous spasm, in the body?

6. In reference to the inspection of the body Observe the state of the abdominal viscera. Are there any signs of inflammation in the stomach and intestines, and where are its seats? Are there any marks of ulceration, effusion of blood, corrosion, or perforation? Collect the contents of the stomach in a clean vessel; also those of the duodenum. What is the state of the large intestines, especially the rectum? What the state of the

larynx, fauces, and œsophagus? What that of the thoracic viscera, and of the brain?

7. In reference to preserving the identity of substances that are to be submitted to chemical analysis. The main question to be settled is, are they the same substances? Have they always been in the possession of the person who first took possession of them? Has he preserved them under lock and key? If transported from one place to another, have they been carefully sealed, so as to preclude the possibility of their having been tampered with?

9. The arrangement and classification of poisons.

As poisons are obtained from the three kingdoms, the mineral, animal, and vegetable, they were formerly divided into three classes, to correspond with them. The principle of their classification, now generally adopted, is founded on their mode of action, as indicated by the symptoms they induce in man. We shall accordingly arrange them under three classes:

1. Irritants:
2. Narcotics:
3. Narcotico-irritants, or acrids.

Under the first, are included all those substances which corrode, or irritate and inflame the surfaces to which they are applied; creating, at the same time, that constitutional disturbance which characterizes a very high degree of inflammatory action.

Under the second, are included all those that attack the nervous centres, developing, as their usually attendant symptoms, delirium, stupor, coma, and convulsions.

Under the third, are included those that combine, in different proportions and degrees, the symptoms that characterize the action of the two first classes.

10. The consideration of the different classes; their orders or groups; and the substances composing them, or the individual poisons.

1. The irritant class of poisons:

This class properly embraces two kinds of substances, viz:

1. Those which have a purely local irritating action upon the part or surface to which they are applied: and,

2. Those which also act remotely, but whose most prominent feature of action is the inflammation they excite wherever they are applied.

The symptoms developed through the action of the irritant class of poisons have a general similarity to each other, varying in degree, and sometimes some little in kind, according to the particular poison given. When taken internally, they cause violent irritation and inflammation of one or more divisions of the alimentary canal. Their action upon the mouth will depend upon their corrosive power and easy solubility. When both these concur, they cause a prickling or burning of the tongue, and a redness, swelling, and ulceration, both of the tongue, and of the palate, and lining membrane of the cheeks. *Christison on Poisons*, 100.

The throat and gullet are the next to suffer from soluble corrosives. In them are experienced burning pains, and difficulty in swallowing. When the poison is not a corrosive, and not easily soluble, the throat and mouth may not be affected until after the poison has exerted its action upon the stomach.

The organ which the most invariably suffers from the action of irritant poisons, is the stomach. The first symptom usually developed is sickness, accompanied frequently with vomiting, tenderness on pressure, tension of the abdomen, especially of the upper part, and occasionally swelling. In the case of corrosive irritants, severe pain is experienced at the same time with sickness. The pain is acute, and generally burning, sometimes lancinating or pricking.

If vomiting is produced, the contents of the stomach are first thrown up; and afterwards, a tough mucous, the product of inflammatory action, often streaked with blood and mingled with bile, is ejected. Frequently, clots of pure blood are vomited up. The stomach may be affected without the intestines suffering. When the poison is of so severe a character as to act upon the intestines, the pain experienced in them is often a sense of burning, but not unfrequently a prickling or tearing pain, and sometimes a twisting and intermitting pain, like that of cholic. There is seldom swelling, frequently tension, and tenderness of the abdomen. The pain of the intestines is generally attended with purging, rarely with constipation, and frequently with tenesmus. The matter discharged consists, first, of the alimentary and fæculent contents, and next of an abundant mucous fluid, often streaked with considerable quantities of blood. All these are attended with great disturbance of the circulation, the pulse becoming quick and feeble; great prostration of strength, coldness, and clammy moisture of the skin. *Ib.*, 101–2.

The morbid appearances caused by corrosives, are usually well marked and clearly exhibited. Sometimes they are confined to small spots, at others extending over larger surfaces. When corrosion is produced, it is followed by inflammation and its consequences. The action extends beyond the corroded part, where we find the evidences of inflammatory action, sometimes in the form of increased vascularity, and at others, with deep redness. The coats are thickened, and are often dark, as if gangrenous, the blood having become extravasated into the mucous membrane and beneath the sub-mucous tissue. They are sometimes softened, but at others hard and shrivelled. The mucous membrane is occasionally found ulcerated, and sometimes, but more rarely, gangrenous. These various appearances may present in the stomach, the fauces, the œsophagus, and the duodenum. In the remainder of the small intestines are found evidences of acute inflammation, ulceration, and softening of the mucous membrane. Ulcers may also be found in the large intestines. *Guy's Principles of Forensic Medicine*, 544.

These symptoms, as well as morbid appearances, must not be considered as alone indicating the action of irritant poisons. There are many diseases, and certain conditions of body, which render discrimination extremely difficult. It is necessary briefly to allude to some of these, and to point out the means of discriminating between them and the action of irritant poisons.

1. *Simple cholera.* This very much resembles irritant poisoning. One point of distinction is, that the vomiting caused by irritant poisoning is very generally bloody, while that of cholera is rarely if ever so. The season of its appearance may also present a point of distinction. The cholera is mostly confined to

summer and autumn. Poisoning may occur at all seasons. Both in cholera and irritant poisoning, there is a sense of acridity in the throat, which accompanies vomiting; but there is this striking difference between them, that in poisoning, this sense precedes the vomiting, while in cholera it succeeds it. Again, cholera seldom proves fatal under three or four days, while irritant poisoning generally does in two days or less. The appearances after death, and the application of the chemical tests, will generally decide. *Guy's Principles of Forensic Medicine*, 544–5.

2. *Asiatic cholera or malignant cholera.* Between this disease, and irritant poisoning, there are many points of resemblance. They are distinguished,

1. By the nature of the discharges, those of irritant poisoning being often bloody; those of cholera more resembling rice-water, with flakes of lymph:

2. By the blue color of the skin, and the peculiar expression of the countenance, which indicates cholera:

3. The sense of acridity in the throat, in the case of cholera, succeeds the vomiting; while in poisoning, that same sense precedes it:

4. The purging follows the vomiting, in case of cholera, much more rapidly than it does in case of irritant poisoning.

3. *Inflammation of the stomach.* If this be of the chronic kind, the slowness of its course will serve sufficiently to distinguish it. There is much doubt whether acute inflammation ever exists as a natural disease; at least, its occurrence is certainly extremely rare.

There are two points by which it may be distinguished:

1. It is not accompanied by diarrhœa:

2. The sensation of burning in the throat, if present, exists only as the consequence of continued vomiting.

4. *Inflammation of the intestines.* This, in the acute form, is much more common than that of the stomach. Its seat is the peritoneal coat, and the mucous coat is rarely if ever involved. It is distinguished—

1. By an obstinate constipation: and,

2. In most cases, by an absence of vomiting.

5. *Drinking cold water or cold liquids.* This has caused death in various ways. Sometimes it has given a sudden shock to the nervous system; at others, it has given rise to acute gastritis; at others still, to cholera; and in other cases, it produces symptoms resembling those caused by the narcotico-acrid poisons. If a person heated by violent exercise, has drank a large quantity of cold water, and soon after expires, the cause of death cannot be very doubtful. The post-mortem appearances, added to the fact, that the chemical tests can detect nothing poisonous, will generally be sufficient to clear up any doubt that may remain.

6. *Distention of the stomach.* Death has sometimes occurred from mere distention of the stomach, without rupture of vessels. A man in good health, for instance, while greedily devouring his dinner, became suddenly blue and bloated in the face; a clammy sweat broke out over his body; and he died almost immediately. On dissection, his stomach was found enormously distended with food; the vessels of the brain extremely gorged, the brain itself appearing too large to be contained within the cranium. There is little danger of confounding this with irritant poisoning. The points of discrimination are—

1. In all such cases the stomach will be found greatly distended:

2. There will be no marks of severe inflammation of the mucus membrane.

7. *Rupture of the stomach.* This is no common occurrence. A case is mentioned by Dr. Christison, 104, of a woman who, having eaten to satiety, was soon after seized with a sense of weight in the stomach, nausea, and fruitless efforts to vomit. She complained that she felt her stomach tearing open, afterwards ceased to make efforts to vomit, became insensible, and during the night expired. The fore part of the stomach exhibited a laceration five inches in length, and a quantity of half digested food had escaped into the abdomen. Rupture has also been caused by an accumulation of gases arising from depraved digestion. In some rare cases a partial rupture, or laceration of the inner coat only of the stomach, is observed. A youth of fourteen, after eating and drinking heartily at a christmas feast, was attacked

with violent and frequent vomiting. The next morning he was unable to swallow; said he felt as if the blood in his heart was boiling; his pulse became irregular, and pressure on the heart or stomach gave him excessive pain. The day following he vomited two pounds of blood at successive intervals, and soon after expired. The inner coat of the stomach was torn in several places, and that of the duodenum was lacerated almost completely round. *Christison*, 106. In all such cases, should the symptoms prove equivocal, the appearances after death could not easily mislead the practitioner.

8. *Rupture of other viscera of the abdomen.* These may be the duodenum, biliary ducts, uterus and its appendages. These may be followed by vomiting, and occasionally by purging, excessive pain and extreme tenderness of the abdomen, cold skin, feeble pulse, and symptoms of collapse, with death within twenty-four hours. Little difficulty will occur in distinguishing all such cases by the appearances presented on a post-mortem examination.

It also becomes necessary to examine the morbid appearances caused by irritant poisons, compared with those of certain natural diseases.

The morbid appearances caused by the powerful irritants are, in the stomach, vascularity, bloody extravasation in the villous coat and into the cavity of the organ, the secretion of a tough mucus, the deposition of coagulable lymph, ulceration, occasional perforation, preternatural softness of the villous coat, and sometimes hardening and shriveling of it. In the intestines, vascularity, extravasation and ulceration.

The corrosives produce much more extensive ravages. They sometimes divest the stomach of its entire mucous membrane. Large patches of its whole coats may be wanting and extensive perforation caused.

1. As to redness of the stomach and intestines from natural causes, or the results of disease, and its distinction from that caused by poisons. Redness of the mucous membrane of the alimentary canal is not an uncommon appearance on a post-mortem examination. This pseudo morbid redness is of various kinds,

and cannot be easily, if at all, distinguished from the parallel varieties caused by inflammation. These appearances are formed three, five or eight hours after death, and are found chiefly in the most depending turns of the intestines, and in the most depending parts of each turn, or of the stomach. After their formation they may even be made to shift their places, and to appear where the membrane was previously healthy, by altering the position of the intestine. This kind of redness has its seat in the veins of the part, and it is the more intense in proportion as the death has been sudden and the circulation active.

But redness when not found on the most depending parts is not necessarily the result of inflammatory action. It is sometimes found in large tracts both in the stomach and intestines without any symptom whatever of inflammation. These have been attributed to the contraction which takes place in the arteries after death, by means of which the blood is forced into the veins. In order to pronounce that the redness is the result of inflammatory action it is important to observe—

1. Whether it occurs in the most depending parts, or whether it is limited to those parts :

2. Whether the reddened membrane is covered with a thick, tenacious, and adhering mucus :

3. Whether the mucous membrane is opaque, and so much so, that when dissected off, and stretched over the finger, the finger is not visible :

4. Whether the cellular tissue, connecting that membrane with the subjacent muscular coat, is brittle ; so that the former may be easily scratched off with the nail.

The membrane may also be stained with a reddish, brownish, yellowish, or greenish tint, from having been in contact with the liver, spleen, or colon, if it contain fæces. This can hardly be mistaken for the result of inflammatory action.

The discoloration may also arise from the presence of colored fluids among the contents. The discoloration produced by a strong infusion of the corn poppy, once came very near being attributed to the action of an irritant poison.

It should be remarked that where an abundance of tough mucus is found secreted in the stomach, it indicates irritation of that organ. So also effusion of lymph is evidence either, of natural inflammation, or of that produced by poisons. Where reticulated lymph is found adhering to the villous coat, and is accompanied with corresponding reticulated redness of that coat, it affords very clear evidence of inflammatory action. *Christison on Poisons*, 126.

2. *Gangrene and lividity.* Gangrene of the mucous membrane is of very rare occurrence. Acute inflammation, by causing an infiltration of blood into its texture, has given it a dark appearance, which, by some, has probably been confounded with gangrene. This lividity has presented itself in various shapes, occasionally appearing in points, striæ, ramifications, and patches; sometimes the vessels being entirely filled with black blood; at others presenting points resembling petuchiæ; and in other cases, still, the membrane itself is thickened with black coagulated blood. The latter appearance would be likely to present in case of poisoning with the mineral acids. These appearances in the stomach in a marked form, are almost always due to the action of violent irritants, and are seldom or never the result of disease. *Guy*, 548–9.

3. *Softening.* This may occur to the mucous membrane in consequence of the action of poisons. It more especially characterises the action of corrosive poisons, and is sometimes the effect of inflammation without corrosion. The softening of this membrane may be produced from other causes arising both before and after death. The distinction between the two is arrived at by attending—

1. To the symptoms, and their history. The softening, from disease, is not preceded by any characteristic symptoms; that from irritant poisoning, by those usually attending the action of irritant, particularly corrosive poisons:

2. The softening, caused by corrosion, is attended by those changes of color, and appearances of violent inflammation, produced by the action of corrosive poisons. If caused by irritants, which are not corrosives, there will also be found to be present marks of acute inflammation. *Guy*, 549.

4. *Ulceration.* This may occur in the stomach, either as the result of natural disease, or from the action of irritant poisons. When it arises from poison, there is a more intense degree of inflammation, than that which occurs when it is the result of disease. The ulcer is also sometimes found discolored by the particular poison whose action has produced it, as in the case of nitric acid and iodine; or, if arsenic has been used, covered with a white powder, or with a substance resulting from the decomposition of the poison. These, taken in connexion with the violence of the inflammation, and also with the symptoms that are developed, will usually be sufficient to indicate the cause of the ulceration.

5. *Perforation.* This may arise from various causes, as,

1. *From corrosion.* An attentive observer will find it difficult to confound a perforation, caused by the direct action of a corrosive poison, with one arising from natural causes. In the first place, the margin of the corroded aperture will not unfrequently be found of a peculiar color. If yellow, the corrosion is due to nitric acid, if brown to sulphuric or the alkalis, and if orange to iodine. In the second place, it may be safely calculated, that if the poison is in sufficient quantity and strength to destroy life before vital reaction takes place around the perforation, some of it will be found in the stomach. If vital reaction have taken place, although no poison may be found in the stomach, as it may all have been ejected, yet the indications of the reaction will at once distinguish it from a gelatinised aperture:

2. *From ulceration.* This is extremely rare. The surrounding membrane is found more highly inflamed than in case of idiopathic inflammation. The condition of the remainder of the alimentary canal, as also a resort to the previous symptoms, may serve to distinguish:

3. *From softening during life, or after death*, from natural causes, or from causes other than the action of irritant poisons. There is a spontaneous perforation that sometimes take place, without proper inflammatory action, but from simple gelatinising of the coats of the stomach. It is very apt to be, and has been, mistaken for the effect of corrosive poison.

Its occurrence, previous to death, is the most frequent in young females, commencing after slight symptoms of indisposition. It generally takes place soon after a meal, and is followed by acute pain in the abdomen. There is little vomiting, no purging, and the patient dies in a state of collapse, in from eighteen to thirty-six hours. The aperture varies in size, has smooth edges, and is usually situated near the lesser curvature of the stomach. The margin is often blackened, the aperture funnel shaped, the mucous coat the most removed, the peritoneal the least. *Guy's Principles of Forensic Medicine*, 550.

In the perforation after death, the seat of the opening is generally the posterior surface of the stomach, but depending somewhat upon the position of the body. It varies much in size, from that of a shilling piece, to one-half the entire stomach. It is of various shape, and its edges are fringed, softened, and smeared with a dark pulpy mass. Sometimes there is more than one aperture. The opening exhibits no appearance of inflammation.

The cause of this singular phenomenon has been the subject of much controversy. The French Pathologists supposed it arose from a morbid process, constituting a peculiar disease, and which, from its imparting to the fluids a solvent power, might extend after death.

Dr. Hunter ascribed it entirely to the solvent power of the gastric juice after death. As the process of softening has been actually traced extending in the dead body, and other proofs have also been adduced, it is now very generally attributed to the action of the gastric juice. *Christison*, 128, &c.; *Guy*, 550. By referring to the remarks just made under the head of perforation from corrosion, and noting the absence of inflammatory action in these cases of spontaneous perforation, it will not be difficult to discriminate this from a case of irritant poisoning.

The intestines also, as well as the stomach, may be perforated by the same erosive or solvent process. They are never perforated by chemical corrosion from within, for either the poison is expelled from the stomach by vomiting, or the pylorus contracts, and prevents the passage of every poison that is sufficiently concentrated to corrode. They may, however, be corroded from without, in consequence of the poison escaping through a hole in the stomach. *Christison*, 136 ; *Guy*, 551.

The irritant class of poisons is divisible into five orders, viz : The *acids*, *alkalies*, *metallic compounds*, *the vegetable and animal irritants*, and the *irritant gases*.

The acids that are resorted to for the purpose of self destruction or homicide are, with one exception, from the mineral kingdom. It is stated that out of 543 cases of death by poison returned by the Coroner's Court of England, in the years 1837–8, thirty-six, or one fifteenth, were by the mineral acids, and thirty-two of these were from sulphuric acid. *Guy*, 553.

Poisoning by the mineral acids, is not so likely to occur as a homicidal act, as by many other poisons. Still there are several cases on record, some of which are enumerated by Dr. Christison, where they have been resorted to for the purpose of homicide. In their administration to adults, they have been either given as medicine, or poured down the throat while asleep—intoxicated. Not long since, a new method of poisoning with the mineral acids was discovered, and that was by throwing them on the person. So frequently was this perpetrated, that a special act was called for and passed by the Parliament of England, prohibiting it under a severe penalty.

The mineral acids have three common properties.

1. They redden vegetable blue ; 2. They color articles of dress, and 3d. They corrode the substances to which they are applied.

The following is a brief statement of the symptoms which characterize the action of the mineral acids. They produce in the mouth, throat and gullet a burning pain, which occurs immediately on swallowing the acid ; next, excessive pain in the stomach, retching, eructations of gases, vomiting, the matter vomited being brownish or blackish, containing blood, coagulated mucus, or portions of the mucous membrane of the stomach.

There is great difficulty of swallowing, and of deglutition ; intense thirst, bowels confined, tenesmus, urine scanty or entirely suppressed. Pulse small and frequent, respiration often laborious, the countenance anxious. The larynx often injured, the voice hoarse. The lips are shriveled and changed in color, the color varying with the acid, being first white and afterwards brown with the sulphuric, and yellow with the nitric. The inside of the mouth is white, shriveled and corroded. The tongue sometimes white and polished, at others changed in color, like the other parts. The marks of the acid are generally found on the cheeks, neck, fingers and clothes. Death takes place commonly with symptoms of collapse, but sometimes life is terminated in convulsions.

Death sometimes takes place in the course of two hours, at others at the end of days, weeks or months ; the symptoms modifying in proportion as the time was longer or shorter. A dry skin and frequent pulse are present, indicating a feverish state. Not unfrequently flakes of tough mucus are vomited. There are pains and spasms of the limbs. Digestion is impaired, all the bodily functions languish, the emaciation becomes extreme and death finally supervenes. *Guy's Principles of Forensic Medicine*, 556 – 7.

There are also cases of imperfect recovery, characterized by a greater mildness of the primary symptoms, and by the patient always being liable to attacks of pain in the stomach, vomiting and disorder of the digestive function.

When the mineral acids are inhaled in the form of gas or vapor, they act chiefly by irritating or inflaming the mucous membrane of the air passages and lungs.

The evidence of having taken nitric or sulphuric acid may be thus summed up.

1. Immediately after swallowing a liquid, a sense of burning is experienced in the throat, gullet, and stomach.

2. Vomiting ensues, the vomited matter often mixed with blood.

3. The mouth becomes white or yellow, and stripped of its lining membrane.

4. The cheeks, neck, or neighboring parts, show vesications, or white, and subsequently yellow or brown, excoriated spots.

6. The clothes show red spots, and wherever they occur are in a disentegrated state.

The morbid appearances are the following.

The body externally appears healthy. The lips, neck and fingers have brownish spots, resembling old parchment or a burn; sometimes they have small verications. The mucous membrane of the mouth is considerably disorganized. It is generally hardened, being whitish, or yellowish with sulphuric acid. The pharynx is often found red, and even swelled. The gullet is sometimes lined with a dense yellow membrane, resembling the inner coat, but of morbid formation. The epiglottis is contracted, sometimes swollen; the larynx is inflamed.

Marked differences are observable in the stomach. It is usually distended with gas, and filled with a glutinous secretion, which is yellowish, brownish or blackish. This extends into the œsophagus and commencement of the small intestines. Its mucous membrane exhibits a high state of inflammation, its vessels being minutely injected with black blood. There is a softening of the rugæ, or separation of the mucous coat, ulceration, and frequently perforation. The pyloric orifice is generally found contracted. When the stomach is perforated, the holes are circular, the coats thin at the margin, colored, disintegrated, and surrounded by vascularity and black extravasation.

The inner coat of the duodenum often presents appearances closely resembling those of the stomach; but, at times, the inner coat of the small intestines is not affected at all.

The outer surface of the abdominal viscera is commonly either very vascular or livid, exhibiting effusion of fibrin and adhesions among the different turns of intestine. Peritoneal inflammation is not usually caused by any other metallic poison except the acids.

Inflammation sometimes extends into the chest, and the thoracic surface of the diaphragm is occasionally found coated with lymph. The blood in the large vessels is often found firmly coagulated. The bladder is commonly empty.

Where the patient lingers for a long period of time, and death results after the chronic variety of poisoning, there is extreme emaciation. The stomach and intestines are found excessively contracted. The stomach exhibits spots of apparently regenerated villous tissue, which is smoother and redder than the natural membrane.

To determine whether a mineral acid, found in the dead body, has been the cause of death, or introduced there afterwards, it will be found, when examined, that wherever the parts are touched by the acid, the mucous coat is yellowish and brittle, while the muscular and peritoneal are white, as if blanched and the blood in the vessels charred. The injury will also be confined to the parts actually touched, and is surrounded by an abrupt line of demarcation, showing no sign of inflammatory redness. Sulphuric and nitric acid produce nearly the same effects, except that in the case of nitric, the whole tunics are yellow, and the disorganization is greater. *Christison on Poisons*, 169.

In relation to the treatment in cases of poisoning with the mineral acids, it should be remarked that as they are local irritants, their poisonous effects may be prevented by neutralising them. But the antidote must be quickly applied or the injury is remediless. Chalk or magnesia, if accessible, should be administered without delay. If nothing better is at hand, the plaster of the apartment beaten into a thin paste with water, may be made use of. Milk and mucilaginous and oily drinks should be freely used, and in large quantities, both previously and subsequently to the administration of the antidote; and should be continued for many days. The subsequent treatment is that of inflammation, and need not be detailed here.

The three principal mineral acids are the *sulphuric*, the *nitric* and the *muriatic*. After the general remarks already made, little need be said upon each one of these acids.

The action of the *sulphuric* acid is distinguished from that of the other mineral acids, by the dark brown appearance of the stain which is formed by it. Taken internally, it produces a great degree of disorganization, perforation of the stomach being very frequent, leaving the color of the mucous membrane, a dark brown or black, as if charred.

The smallest quantity of sulphuric acid known to be destructive to life in the adult, was one drachm, which proved fatal in seven days. The shortest period in which it has proved fatal is two hours.

This acid is clearly carried to different parts of the body by the circulation. In a pregnant female poisoned by it, it was detected in the peritoneum, pleura, heart, bladder, liquor amnii and fœtus. *Guy's Prin. of For. Med.*, 562 – 3.

The nitric acid causes a less degree of corrosion than the sulphuric, perforation of the stomach being a rarer occurrence. Its action is distinguished from that of the sulphuric by the orange or brownish yellow color of the stains. When the mucous membrane is touched by it, it becomes yellow in parts, or green from the action of the acid on the bile.

Yellow stains are not distinctive of the action of nitric acid. They may also be produced by iodine or by bile. They may be thus distinguished. When touched with a weak solution of caustic potash, stains from nitric acid become orange yellow, and the stain is indelible. When touched with the alkali, those caused by iodine immediately disappear, while those caused by bile undergo no change. *Guy*, 566.

The smallest quantity of nitric acid which has destroyed life is two drachms, and the shortest period within which the poison has been known to prove fatal in the adult, is one hour and three quarters; and in the infant in a few minutes. *Guy*, 567.

The *muriatic* acid is seldom made use of for the purpose of poisoning. The smallest quantity which has destroyed life was one ounce, and the shortest period, within which it has proved fatal, was five hours and a half. *Guy*, 571.

The *oxalic acid* or *acid of sugar*, is a substance of great interest, and has recently, in England, been frequently employed as a poison. In its crystalline state it bears a very great resemblance to Epsom salts, for which it has been very often mistaken, and thus given rise to melancholy and fatal results. There are several points of difference between them.

1. The acid has an extremely sour taste, while the salts are bitter.

2. The acid in solution has a strong acid re-action: the salts are neutral.

3. The acid is entirely dissipated by heat; the salts and zinc are fixed by it.

4. Liquor potassæ produces no change in a solution of oxalic acid, while it precipitates the white oxides of the salts and zinc.

5. The acid discharges the color of ink, while the salts produce no change in it. *Guy*, 572.

Several experiments have been made of the action of this acid upon animals; from which, it has been ascertained, that it acts differently, as its quantity is greater or less; and also as it is administered in a concentrated or considerably diluted state. This is reckoned one of the most rapid and unerring of all the common poisons, and acts with violence to whatever texture of the body it is applied. A large dose, and concentrated solution, causes the appearance of symptoms immediately on swallowing the poison. The most prominent of these are, a sour taste, burning sensation in the stomach, and occasionally in the throat; a vomiting, sometimes of bloody matter, but generally of a greenish brown, or black grumous matter. After some hours, if the patient survive, there is purging of a similar matter, sometimes tinged with blood. Other symptoms are those of collapse, pale and anxious countenance, small and frequent pulse, cold and clammy skin, hurried respiration; to which are sometimes superadded, convulsions. There are also, after some hours, soreness of mouth, inflammation and swelling of the tongue, constriction of the throat, painful deglutition, intense thirst, restlessness, difficulty of breathing, cough, extreme debility, cramps and numbness of the legs and arms, acute pain in the head and back, delirium and convulsions. *Guy's Principles of Forensic Medicine*, 574.

The symptoms are not always uniform. Pain and vomiting have been absent, and an eruption has, in one instance, appeared on the skin. When the acid is considerably diluted, it ceases to corrode, and even hardly irritates. It then acts indirectly on the brain, spine, and heart. When the dose is large, it produces palsy of the heart. A smaller dose causes an animal to perish, after several fits of violent tetanus, affecting the respiratory muscles of the chest, fixing it spasmodically and causing suffocation. A still smaller dose causes death under symptoms of pure narcotism. *Christison on Poisons*, 201.

From the fact that leeches applied to the epigastrium, in a case of poisoning by oxalic acid, speedily die, it has been inferred that the blood is altered in its quality, through the action of the poison.

The post-mortem appearances are—

1. The body natural, the countenance pale and composed:

2. Mucous membrane of the mouth and fauces white, shriveled, and easily detached:

3. Lining membrane of the œsophagus more or less detached:

4. Mucous membrane of the stomach is, at times, pale, and free from rugæ; at others, the membrane is highly inflamed, and the rugæ strongly marked:

5. The stomach contains a thick fluid, commonly dark, like coffee grounds, containing a good deal of blood; its vessels are minutely injected with black blood; its mucous membrane is easily stripped off, and sometimes is found extensively detached; perforation may sometimes be found, but it is of rare occurrence:

6. The small intestines have, in some cases, presented the same appearances as the stomach:

7. The peritoneum has been found inflamed, and in one case, the right pleura also:

8. The lungs are sometimes greatly congested; and, in one instance, there existed traces of inflammation of the brain.

The smallest quantity of oxalic acid which has destroyed life, is half an ounce; but a recovery has been had where two or three times that quantity was administered. But a much less quantity than that has produced severe symptoms. The shortest period at which death has taken place, is ten minutes, the dose being one ounce. In the case where half an ounce was taken, the death occurred at the end of twenty-three days. *Guy's Principles of Forensic Medicine*, 575.

Dr. Christison remarks, *page* 207–8: "If a person, immediately after swallowing a solution of a crystalline salt, which tasted purely and strongly acid, is attacked with burning in the throat, then with burning in the stomach, vomiting, particularly of bloody matter, imperceptible pulse, and excessive languor, and dies in half an hour, or still more, in twenty, fifteen, or ten minutes, I do not know any fallacy which can interfere with the conclusion, that oxalic acid was the cause of death. No parallel disease begins so abruptly and terminates so soon; and no other crystalline poison has the same effects."

In regard to treatment, it is obvious that the rapidity of operation is such, that unless remedies are speedily administered, they can be of no utility. The proper antidotes are chalk and magnesia. If these cannot be immediately obtained, the plaster of the apartment may be resorted to. Lime-water and oil have been used with advantage. Emetics may be made use of, unless the vomiting is already free. Sulphate of zinc is recommended as an emetic. The alkalis should not be used, as they form, with the acid, salts which are themselves poisonous. *Guy*, 75; *Christison*, 206 – 7.

THE ALKALIES, AND THEIR SALTS:

These are, potash and its carbonate; soda and its carbonate; ammonia and its carbonate; the two first being the fixed, and the last being the volatile alkalies.

The action of the fixed alkalies is purely irritant, and strictly local. When concentrated, they chemically decompose, softening the animal tissues, and reducing them to a pulpy mass. When diluted, they inflame without corroding the textures. Poisoning with the fixed alkalies is rare, seldom occurring except as the result of accident. The usual symptoms developed by them are, "an acrid burning taste in the mouth, which accompanies the act of swallowing, and extends rapidly to the throat and gullet. This is followed by acute pain in the pit of the stomach, and great tenderness on pressure; frequent and violent vomiting of tenacious mucus, often containing blood, and tinging vegetable blues green; violent colic pains, and purging of stringy mucus, mixed with blood. There is constriction of the throat, with difficult deglutition, and sometimes hoarseness of the voice and cough. In the more acute cases, death takes place with symptoms of collapse, excessive weakness, cold sweats, hiccough, tremors, and convulsions. In the chronic cases, there is constant vomiting of food, difficulty in swallowing, bloody stools, tenesmus, rapid emaciation, and death from starvation. In still more chronic cases, death is due to long continued stricture of the œsophagus." *Guy*, 578 – 9.

The post-mortem appearances have generally been found to differ with the nature of the case. Usually, the mucous membrane of the throat and gullet is softened and corroded, with inflammation, in varying degrees of intensity, in the œsophagus, stomach and intestines; patches of ulceration, and dark spots caused by the extravasation of blood beneath the membrane. The inflammation is sometimes found extending to the larynx. In chronic cases, large portions of mucous membrane are found removed, with the contraction of the gullet and stomach. *Guy*, 579.

In regard to treatment, the first object is to neutralize the poison. This may be accomplished by giving the acetic acid, vinegar, diluted; also lemon juice, or citric acid, diluted, may be administered. Almond or olive oil may also be given, together with acidulated demulcent drinks.

The smallest quantity which has proved fatal is half an ounce, and the shortest time within which it has proved fatal, is twelve hours. *Guy*, 579.

The nitrate of potash, nitre, saltpetre, is a dangerous poison, when taken in considerable quantity, and has been not unfrequently taken by mistake for sulphate of soda, which it very much resembles in appearance. Several cases have occurred, in one of which, the symptoms were nausea, vomiting and purging; the muscles of the face being convulsed; the pulse weak, respiration laborious, extremities cold, but a sense of burning and severe pain in the stomach. In another case, which also terminated fatally, the symptoms were those of violent cholera. In another, there was pain in the stomach, and swelling of the whole body. In another, reported by Dr. Falconer, there occurred immediately violent pain in the epigastrium, in half an hour vomiting, and in three hours, about a quart of blood was discharged from the stomach. The person recovered, but was afterwards subject to attacks of pain in the stomach. The use of speech, and power of voluntary motion, have been known to be lost; insensibility to supervene, and finally an attack of tetanic spasms. *Costill on Poisons*, 43-4-5.

The appearances after death are those which characterize violent inflammation of the stomach and intestines; the contents tinged with blood; the peritoneal coat of a dark red color, mottled with black spots.

To this poison there is no particular antidote. There should be a copious exhibition of demulcents, and if vomiting be absent, of emetics.

Ammonia and its salts:

Ammonia is called the volatile alkali, as it is a gaseous body when pure. The alkaline poisons included under the above general term, exert a double action on the system. They not only act as powerful irritants, but produce besides, through the medium of the blood, a disorder of some part of the nervous system. This nervous affection consists probably of irritation upon the spinal column, as it very closely resembles tetanus. *Christison*, 223.

The effects are generally simply irritant, the seat of the irritation varying with the mode of administration. When swallowed, the stomach and intestines suffer; when inhaled, inflammation seizes upon the lining membrane of the nostrils and air-passages. A case is mentioned, of a medical man, liable to epilepsy, being found in a fit by his servant, who endeavored to rouse him by holding to his nose a handkerchief dipped in ammonia. Two drachms were in this way consumed. A burning pain from the mouth downward to the stomach was experienced, great difficulty of swallowing, difficult breathing, severe cough and expectoration, a mucous discharge from the nostrils, and excoriation of the tongue. He died in the course of the third day.

In this case, the following morbid appearances were presented: The nostrils blocked up with albuminous membrane; the whole mucous membrane of the larynx, trachea, bronchi, and some of the bronchial ramifications, mottled with patches of lymph; the gullet and stomach exhibiting here and there red streaks; and a black eschar on the tongue, and another on the lower lip. *Christison*, 225.

Remedies. The vegetable acids, such as vinegar, lemon juice, or citric acid. The oils, also, such as castor, olive, or linseed, may be used with advantage. *Costill*, 42–3.

There are some other poisons included under this group and general division, but their small importance in a medico-legal point of view, must justify our passing over them here without comment. We accordingly pass to another division of poisons, viz:

The Metallic Compounds; at the head of which stands

ARSENIC.

Of all the substances within the entire range of toxicology, this is the most important to be understood by the medical jurist. It is a substance extremely common, so cheap that it may be purchased by almost every body; may be bought under a plausible pretext; may be mixed without suspicion, with many articles used as food; possesses scarcely any taste, and is, when administered, a deadly poison. All these circumstances go to favor the employment of this, as the most common means, of effecting murder in a secret manner.

As a compensation for all this, it happens to be very fortunate, that there is perhaps no other poison, the presence of which can be detected in such minute quantities, and with so great a degree of certainty.

There are many different preparations of arsenic, such as fly-powder, the arsenious acid, or white arsenic, the arseniate of copper, or mineral green, the various sulphurets, &c. But the only preparation necessary for the medical jurist to be well acquainted with, is the arsenious acid, or white arsenic, or as it is more commonly called, arsenic. This is met with in two forms, the one, the more usual, that of a fine snow-white powder; the other, in solid masses, generally opaque, sometimes translucent.

This preparation is an oxide, arising from the combination of the metal with oxygen. The metal itself is entirely inert, possessing no poisonous quality.

The two properties of arsenic which are the most important to be inquired into, are its solubility and its taste. Its degree of solubility is important to be settled, as on that depends very much the fact, whether, when swallowed in the solid state, we may expect to find it in such a state, or dissolved among the fluid contents of the stomach Water dissolves it, but its power of doing so has been variously estimated by different experimentalists. Hahnemann states, that, at the temperature of the blood, a thousand parts of water dissolve ten parts of the arsenious acid, having the aid of ten minutes agitation. The presence of organic principles in the water, renders the poison less soluble. In consequence of its insolubility, while among the organic mixtures of the stomach, it is the most generally found solid, but it is sometimes found among the fluid contents. *Christison*, 23–5; *Guy*, 484.

As to its taste, it was once asserted that it had an acrid taste, but in reality it has little or no taste at all. If anything, it has a faint sweetish taste. It makes very little impression, as it is often swallowed unknowingly with articles of food.

Some other qualities are, that in solution, it has a very slight acid reaction; when dissolved in boiling water, and slowly evaporated, it deposits well formed, octohedral crystals; and when taken combined with alkalies, it forms soluble arsenites. *Guy*, 584.

The chemical tests by which arsenic may be detected, whether it exist in the solid form, or in solution, or in organic liquids, or in the fluids and solids of the human body, are all matters of interest to the medical jurist Their application, however, will hardly be undertaken by any one who is not a professed chemist, or, who has not learned the practical methods by which it is made. I cannot dwell upon them extensively in this place. They may be found particularly detailed in Christison, Guy, Beck and Taylor. A bare reference to some of them is all that can be here undertaken.

The simplest test for oxide of arsenic in its solid state, is to reduce it to the metallic state. The instrument, generally made use of for this purpose, is a glass tube, the material for its reduction being freshly ignited charcoal. The best method of applying the heat is with the spirit lamp. Soon a well defined crust will be formed, having the character of the fly-powder. This will detect the arsenic in exceedingly small quantities. A crust weighing a twentieth of a grain, when properly formed, exhibits the physical properties of arsenic to the naked eye with as great distinctness as any quantity however large.

There are some other tests, such, for instance, as its alliaceous or garlicky odor. This is evolved by the sublimation of metallic arsenic only, and not by the oxide. The objection to this is that it does not always detect arsenic when present, and that the same odor affords no infallible proof that it is present. Zinc powder, phosphorus, phosphoric acid, and the phosphates, give out a similar odor.

Solid arsenic produces a silvery alloy, when the oxide is mixed with carbonaceous matter, and heated between two copper plates. This is now little used, as it requires something more than a grain to make application of the test, which quantity may be subjected to other tests with more satisfactory results.

The oxide may also be converted into the arsenite of copper, by keeping it, for a few hours, in a solution of the ammoniacal sulphate of copper. The mode of applying the ammoniacal sulphate, as well as the ammoniacal nitrate of silver, is to press the oxide in powder, by means of a glass rod, into common writing paper; to touch the spot with a drop of solution of sulphate of copper, or nitrate of silver; to place the paper, so prepared, over a phial of ammonia, and to expel the ammoniacal gas through the paper, by plunging the phial into hot water. *Christison*, 245. By these means, the green and yellow colors speedily appear, which characterise the action of the copper and silver tests or arsenic in solution.

The arsenic may be sometimes found in a state of solution, when it may be subjected to the reduction process, to exhibit metallic arsenic, or to the liquid tests. The general principle, upon which the first is accomplished, is "to throw down the whole arsenic in the form of sulphuret, by means of sulphuretted hydrogen; to convert the sulphuret, by the process of reduction, to the metallic state; and to oxidate the metal thus procured." *Christison*, 246.

The liquid tests are resorted to for the purpose of causing, in the solution, peculiar precipitates. The re-agents, generally employed for this purpose, are the sulphuretted hydrogen, the ammoniacal nitrate of silver, and the ammoniacal sulphate of copper. The indications of each should concur, and when they do so, the proof they furnish is clear and satisfactory. It is not deemed necessary, or advisable, to go into the consideration of either of these liquid tests.

Marsh's, or the hydrogen test, evolves hydrogen, in the nascent state, from the action of diluted sulphuric acid on zinc, and by means of it, decomposes arsenic and its soluble compounds. In the application of it, the metallic arsenic combines with the hydrogen, forming arsenuretted hydrogen gas, which possesses the properties of burning with a bluish white flame and thick white smoke, and also of impressing a dark stain upon a cold plate of glass, which is held in the flame, which arises from a deposit of arsenic upon it. In the centre of this stain is the pure metallic arsenic. On the outside of this, is an opaque black ring exhibiting, at the extreme edge, a clear hair brown color. Outside of this is a thin, wide film, of a milk white appearance, which is the arsenious acid reproduced by combustion. The objection has been urged that antimony produces nearly the same stain as arsenic, but a difference has been observed in the following respects, viz., the antimonial stain lacks the bright metallic lustre, which distinguishes that of arsenic, and also it appears smoky black, by means of transmitted light, while that of arsenic is of a hair brown color. If the arsenical and antimonial deposites are received on a sheet of bright copper or brass, the former have an iron gray lustre, and clear metallic polish, while the latter present the same rings of black hydruret of antimony, alternating with rings of oxide, which are observed on glass. *Taylor*, 131–2.

Another test, denominated Reinsch's, is for the detection of arsenic in liquids. A few drops of muriatic acid are added to the suspected solution, and a slip of bright copper placed in it. The liquor is then brought to a boiling point, when, if arsenic be present, the copper acquires an iron gray coating from the deposit of that metal. This may scale off, if the arsenic be present in large quantity. From the slip of copper washed, dried, and gradually heated, arsenious acid will be sublimed in minute octohedral chrystals. When the quantity of arsenic is small, the copper will exhibit a faint violet or blue coat, and the deposit is materially affected by the quantity of water present. To this it is objected, that other metals may be deposited on copper, under similar circumstances. To the objection it is replied, that from the arsenical deposit octohedral chrystals of arsenious acid may be procured, by slowly heating the slip of copper in a reduction tube. *Taylor's Med. Juris.*, 134.

It not unfrequently becomes important to test the existence of arsenic in liquids containing organic matter. For this purpose, a slip of bright copper may be placed in a portion of the liquid boiled, and acidulated with pure muriatic acid. If arsenic is present, this will soon acquire a gray metallic coating. This should be dried and heated in a reduction tube, for the purpose of obtaining octohedral chrystals of arsenious acid. *Taylor*, 135. Before any step is taken in testing organic fluids, a transparent solution should be obtained. In subjecting these fluids to the test, it is important, first, to destroy the animal matter, to concentrate the poison, and subsequently, to reduce it. In order to accomplish the first, the nitrate of potash, the nitric acid, and the sulphuric acid may be employed.

Arsenic, when really present in the stomach at death, does not readily disappear afterwards. Many instances have occurred, in which it has been detected in the dead body long after death. In one case, it was found fourteen months after interment; in another, at the end of three years; and in another still, after seven years interment. In such cases, it will generally be found attached to the coats of the stomach, in the form of a sesquisulphuret of arsenic, formed by the union of the arsenious acid, with the sulphuretted hydrogen generated in the process of putrefaction. It may be collected, dried, and reduced with black flux. *Guy's Principles of Forensic Medicine*, 596.

In relation to the action of arsenic upon the living system, several important points of enquiry present themselves. These are,

1. The quantity required to produce fatal effects:
2. The time within which its effects begin to be developed:
3. The course and character of the symptoms, including the periods of time, within which, it proves fatal:
4. The treatment:
5. The post-mortem appearances.

1 As to the quantity. This, of course, will be found to vary with the strength and power of the constitution to be subdued. In a child four years old, four and a half grains in solution destroyed life in six hours. Fifteen grains destroyed the life of a young man of twenty-two years of age in four and a half days. In the case mentioned by Alberti, six grains destroyed the life of a man. Hahnemann says, that, "in circumstances favorable to its action, four grains may cause death within twenty-four hours, and that even one or two grains may prove fatal in a few days. Small quantities have often given rise to very alarming symptoms. So larger quantities, as much as one ounce, have been taken, and yet the patient, under the use of sulphate of zinc and magnesia, has recovered. *Christison*, 275 – 6 ; *Guy*, 600.

2. The time within which its effects begin to be developed. This is various, depending much upon circumstances. When taken in solution, the effects begin to be manifested much sooner than when administered in the solid state. In a case in which arseniate of potass was taken, the symptoms began violently in fifteen minutes; where the oxide was mixed in coffee, the effects were manifested immediately on taking the second cup. In another case, the symptoms began in eight minutes. The assertion, therefore, made by some, that arsenic never begins to operate under half an hour, is a mistake. It may however be admitted, and laid down as a general rule, that this poison, under ordinary circumstances, does not begin to operate within half an hour from the time it was taken. It is also equally as true, that its

operation is seldom delayed beyond an hour. There have been, however, instances in which a much longer period of time has intervened, between the taking it and its effects. In one case, the arsenic taken at eight in the evening, did not begin to manifest itself until eleven, the person having slept during the intermediate time. In another case, the symptoms did not begin to appear under three hours. In another, scarcely any symptoms appeared for five hours. In another, very extraordinary case, a white draught was administered at ten in the evening, to a girl, who went immediately to bed. No well marked symptom appeared until six the next morning, from which time her illness went on uninterruptedly. In all these cases, a state of sleep intervened, between the taking of the poison and the production of its effects. It is therefore not improbable, that the greater comparative inactivity of the system during sleep, may operate to retard the action of the poison. When taken upon an empty stomach, the symptoms will be developed sooner than when taken upon one filled with food. The rule above laid down, may be taken subject to be varied by the following disturbing influences, viz: the taking it in a state of solution, or on an empty stomach, or the intervention of a state of sleep between its administration and effects. *Christison on Poisons*, 279–80.

3. The course and character of the symptoms, including the period of time within which it proves fatal.

Arsenic, although included in the irritant or acrid class of poisons, is, in strictness, a narcotico-acrid, as it possesses both an irritant and narcotic power. So far as it produces inflammation in the alimentary canal or elsewhere, it is purely irritant; but so far as it creates disorder of parts or organs remote from the seat of its application, it is narcotic, although the symptoms it occasions are somewhat different from proper narcotism.

The medium through which arsenic acts, is not yet clearly settled. It seems never to have been detected in the blood, yet it is generally believed to enter it and act through it. It is a fact, that it acts with almost equal energy, whatever be the organ or texture to which it is applied. It acts when taken into the stomach, when laid on to a fresh wound, when applied to the conjunctiva of the eye, when injected into the rectum, when brought into contact with the mucous membrane of the vagina, and even, under some circumstances, when applied to the surface of ulcers. *Christison on Poisons*, 271 – 2.

It appears to act the most efficiently, when injected into a vein, or applied to a fresh wound, or introduced into the peritoneal sac. The symptom which is the most uniformly produced, is that of inflammation of the stomach. This occurs, whatever be the texture of the body with which the arsenic is brought in contact, unless death has ensued too quickly to admit the development of inflammatory action. When externally applied, it has caused a higher degree of inflammation of that organ, than when it has been swallowed.

The symptoms of poisoning with arsenic are most conveniently arranged under three heads: In the first, there is violent inflammation of the alimentary canal, occasionally embracing other mucous membranes, accompanied with excessive general depression. In the second, there is little irritation, sometimes trivial vomiting, or slight pain in the stomach, excessive prostration of strength, and frequent fainting. In the third, the signs of inflammation in the alimentary canal at first appear, and these, about the third or fourth day, are either succeeded or accompanied by symptoms of irritation in the other mucous passages, and also by palsy or epilepsy, or other indications of derangement of the nervous system. *Ib.*, 277 – 8.

The first class of cases is the most frequent. The duration of a case in this class generally exceeds twenty-four hours, but seldom more than three days. The first symptom of a decisive character, is sickness and faintness. The region of the stomach, at the same time, feels painful; the pain being of a burning kind, and aggravated by pressure; vomiting and retching ensue. There is a sense of dryness, heat, and tightness, in the throat. The matter vomited is greenish or yellowish, and sometimes streaked with blood.

Diarrhœa is occasionally present. The pain at the pit of the stomach becomes excruciating, and is compared to a fire burning within. The abdomen becomes tense and tender, sometimes swollen, and sometimes even drawn in at the navel. In some cases, a burning pain extends along the entire course of the alimentary canal.

There are occasionally signs of irritation of the lungs and air-passages, shortness of breath, a sense of tightness across the bottom of the chest, and pain darting through its upper part. The urinary passages are sometimes affected; there is painful micturition, pain in the region of the bladder, and swelling of the penis. If a female, pain in the vagina, and excoriation of the labia.

The symptoms of irritation of the alimentary canal, are, not unfrequently, succeeded by convulsive motions, commencing on the trunk, and extending over the whole body. These consist generally of tremors and twitches. There are also distressing cramps of the legs and arms, which are peculiarly severe and frequent.

The local derangement affects, more or less severely, the general system. The pulse becomes small, feeble, and rapid, and in time, almost imperceptible. There is great coldness, clammy sweats, and sometimes lividity of the feet and hands. The countenance appears collapsed, and is expressive of great torture, and extreme anxiety; the eyes red and sparkling; the conjunctiva injected; the tongue and mouth parched; delirium sometimes present, and stupor not unfrequent. Death is sometimes preceded by convulsions. *Ib.*. 282.

There sometimes occurs a total intermission of all the distressing symptoms, which is accompanied with dozing stupor. This may occur more than once.

These are the symptoms the most generally attending the first variety, which embraces the cases the most commonly occurring of poisoning with arsenic. They may not all be present, and they may be developed in different degrees of violence; but it may be laid down, as a general, rule, that the symptoms of poisoning with arsenic are very uniform.

2. The second class of cases includes those in which there are little if any signs of inflammation, death commonly ensuing in

five or six hours, too early for inflammatory action to be developed. The action here is probably on some remote organ.

Three conditions are necessary to the occurrence of this variety, viz :

1. That the dose should be large :
2. That it should be administered in little masses : or,
3. In a state of solution. The principle seems to be, that a large quantity of the poison is suddenly taken into the system, and that, by that means, its remote action may commence before its local inflammation is fully developed.

Several cases illustrating this variety are given by *Dr. Christison*, 286-7-8. In the case of a young man, who made use of an arsenical solution to cure the ague, he was attacked after taking it with vomiting, and gave utterance to loud cries ; afterwards talked incoherently ; then fell into a profound sleep ; and finally perished in convulsions in five hours. In another, who swallowed an ounce of powdered arsenic, the chief symptoms were two or three fits of vomiting, and afterwards slight pain and heat in the stomach. He died in eight hours, and the stomach and intestines were found quite healthy. A girl, fourteen years of age, took about ninety grains, and died in five hours, having vomited once or twice. She complained of some little pain in the belly, and was affected, towards the close, with great faintness and weakness. The stomach and intestines were healthy. Another person expired in five hours, and no vomiting occurred at all, although emetics were given. In another case, death took place in eight or nine hours ; the symptoms being at first slight vomiting, afterwards little else than faintness, sickness, a sullen expression, and general appearance considerably resembling intoxication.

In a case where a large quantity of arsenic was taken in fragments, death occurred in a few hours. There was no other symptom present than great feebleness and frequent tendency to fainting. The stomach and intestines were not affected during life, nor was any morbid appearance discoverable after death.

The most uniform symptom characterizing this variety, is extreme faintness, attended occasionally with some degree of stupor, or rather oppression, and often with slight convulsions. Pain in the epigastrium is generally present, but it is slight and unaccompanied with other signs of inflammation.

This variety is not of frequent occurrence, and appears not to be generally understood. It may pass, by almost insensible gradations, into the first variety. *Christison on Poisons*, 289.

3. The third variety of symptoms occurs when either a small quantity has been taken, or where, a considerable quantity having been swallowed, a portion of it has been vomited up. It brings more clearly into view its action on the nervous system.

There are generally two trains of symptoms which characterize this variety, the one of which usually follows the other. The first is composed principally of signs of inflammation in the alimentary canal, and may therefore be termed the inflammatory stage. The second is composed of symptoms referable to nervous irritation. These symptoms are considerably various. Sometimes it is imperfect palsy of the arms or legs, and occasionally consists of coma. There have also been observed epileptic fits and tetanus, and also an affection resembling hysteria or mania.

The nervous symptoms generally succeed the inflammatory; rarely, they may be found co-existing at the same time. There has been observed in some cases a singular combination of delirium, convulsions, tetanus and coma, such as is frequently met with in paroxysms of hysteria. "Sometimes the convulsions caused by arsenic assume the form of pure tetanus." *Christison on Poisons*, 292.

Another affection of the nervous system occurring in an advanced stage, is partial palsy. In cases of recovery, an incomplete paralysis of one or more of the extremities, resembling the lead palsy, is very frequently observed.

A case is stated of a female who took a small quantity of arsenic by mistake. The inflammatory stage was easily subdued. On the fourth day she was attacked with cramps, tenderness and weakness of the feet, legs and arms, increasing gradually till the whole extremities were almost entirely palsied. In this case, the power of motion returned first in the hands, then in the arms, and eventually in the whole body. *Christison*, 293.

In another case, the paralytic affection consisted in the loss of sensation and power of motion in the hands, and loss of motion in the feet, attended with contraction of the knee joints. Local palsy appears to be a very frequent secondary effect of arsenic. In some cases, it is completely incurable.

Our attention has now been entirely directed to the effects of arsenic, when introduced into the system, through the medium of the stomach. It remains to examine those effects when introduced through other channels.

It may be applied externally to blistered surfaces, eruptions, ulcers, wounds, or other parts deprived of the cuticle, and causes both local inflammation and constitutional symptoms. Several cases have occurred illustrating this fact. A girl having psoriasis of the scalp, rubbed it with a liniment of butter and arsenic. She was soon after seized with acute pain and swelling of the whole head, fainting fits, restlessness, fever, delirium, and died in six days. *Christison on Poisons*, 297.

The application of arsenical paste to an ulcer of the breast, caused strongly marked constitutional symptoms. Although the quantity was small, and the application only for a single night to a surface of half an inch in diameter, yet the next day there was violent cholic and frequent vomiting; the countenance became collapsed, and death occurred in two days.

There is much uncertainty attending the action of arsenic, when applied to ulcerated surfaces. One reason probably is to be sought in the quantity applied. It has been suggested, and with some reason, that a large quantity applied to sores, is less likely to produce fatal effects than a small, as the large quantity quickly destroys the part and prevents absorption, while the small, if properly applied, will cause little local injury, and readily enter the absorbent system. Again it is said, that it may be applied to ulcers, wounded surfaces, or the abraded skin, without any great degree of danger, provided the part be not recently wounded so as to pour out blood. The danger arises from its coming in contact with an open mouthed blood vessel. If a fresh surface be made to an ulcer, by paring away the granulations previous to the application of the arsenic, danger may be apprehended from its application. *Christison*, 298–9. There is considerable variety of symptoms in cases of external application. The inflammation is not unfrequently local, extending around the eruption or ulcer. Sometimes it extends to, and embraces the alimentary canal; and very frequently there is an affection of the nervous system. Sometimes it occasions partial palsy of the muscles adjoining the seat of its application, without otherwise injuring the nervous system, or disordering the stomach, or causing inflammation. *Christison on Poisons*, 299.

It has been occasionally, although very seldom, introduced by injection. Several instances have occurred of its having caused death by being introduced into the vagina. In one case of this kind, the woman was attacked with acute pain in the stomach and incessant vomiting. She then became delirious, and died in twenty-one hours.

Poisoning with arsenic may also take place through the bronchial membrane, or membrane of the air passages, although it is of rare occurrence. As formerly remarked, whatever be its application, it almost uniformly produces signs of irritation, and consequent inflammation, of the stomach.

The principal points to be observed in relation to symptoms are,

1. The time of their commencement—how soon after a meal, how many there were at the meal, and of what dishes they partook—whether sleep intervened or not, between the meal and commencement of symptoms:

2. The character of the symptoms that first appear. If irritation and inflammation, what portions of the mucous membrane of the alimentary canal are affected, what is the state and condition of the stomach, what of the intestines, what the indications of constitutional derangement:

3. The succession of the symptoms. In what manner they succeed each other:

4. To note whether any symptoms occur which indicate disorder of the nervous system; what they are, when they are ob-

served, what other symptoms they accompany or succeed, and what is their particular character and course of succession.

4. The treatment. The first object should be to remove the arsenic from the stomach. If removed before any part of it becomes dissolved and has entered the blood, or otherwise been taken into the system, no serious bad effect may be expected from it. As it sometimes serves itself the purpose of an emetic, it will occasionally cause its own expulsion, together with the other contents of the stomach. This will be more likely to take place, where it has been taken in large quantities, upon a full stomach. To promote vomiting, sulphate of zinc may be administered. The use of the stomach pump has been also recommended. When the sulphate of zinc is not at hand, a substitute may be found in mustard powdered, in the proportion of one or two teaspoonsfull to a glass of water, administered at intervals. *Taylor*, 124. Powder of charcoal has been recommended as an antidote, but the manner of its operation is probably by enveloping the particles of arsenic, and thus preventing their injurious action until they can be expelled. Magnesia may perhaps operate in the same way. A mixture of milk, lime water, and albumen, has been much recommended. There appears not yet to be discovered any specific antidote to the action of arsenic; any substance that, by uniting with it while in the stomach, will neutralize, and thus render it innocuous. That which comes nearest to an antidote, seems to be the hydrated peroxide of iron, given in doses of a tablespoonful to an adult, and a dessert spoonful to a child, every five minutes, mixed with water. If this should not be at hand, the precipitated carbonate, or the rubigo ferri in very fine powder, may be given, every five or ten minutes, until some relief is afforded. The efficacy of the hydrated peroxide is not, however, universally admitted; but it may, perhaps, be stated as the antidote now the most relied upon. When the poison has been expelled or neutralized, the object should be to subdue the inflammation of the alimentary canal, and to sustain the system by mild treatment. *Costill*, 52–3.

5. The post-mortem appearances. These will differ, with the different varieties. In the second variety of symptoms, where

death takes place in a few hours, there are frequently no morbid appearances left in the system. Death occurs too soon to permit inflammatory action to develope itself. It must not, however, be supposed, that in all cases in which death takes place within a short period, no morbid appearances will be found. In many such cases they have been found. *Christison on Poisons*, 309-10.

The diseased appearances are the most likely to exhibit themselves, in those cases, where the death has been delayed until the second day, or longer. These appearances are the following:

1. Redness of the throat and gullet. This is by no means common, severe inflammatory action seldom embracing both, or either:

2. Redness of the inner coat of the stomach. This is a very constant attendant as the effect of arsenic. There is nothing peculiar in the redness, nothing to distinguish it from other inflammatory redness, or even from the pseudo-morbid varieties of redness. This inflammatory redness seldom extends to the peritonæal coat of the stomach. There is sometimes a turgescence of the external veins sufficient to make the stomach look livid:

3. Blackness of the villous coat. This, when it occurs, proceeds from effusion of altered blood into its texture. When the irritation has been violent, the color is a brownish black, or grayish black; the inner membrane is elevated into firm knots, or ridges, by the effusion, and the black spots are surrounded by vascularity, or other signs of reaction:

4. There is an unnatural softness of the villous coat of the stomach. Sometimes also it is brittle, so as to be easily separable by the nail:

5. At times the villous, and even other coats of the stomach, are actually removed in scattered spots and patches:

6. On the stomach's inner surface, are often found various secretions. The most common is a mucous secretion, which is frequently thin and glairy, but sometimes abundant and solid, as if coagulated. A sanguinolent fluid is sometimes found in the cavity of the stomach, and a bloody effusion is considerably relied on to prove the administration of arsenic, or some other active irritant:

7. The presence of the arsenic itself among the contents of the stomach. Some portion will be likely to remain after long continued vomiting. It may occasionally be found dissolved among the contents of the stomach, but more commonly is detected there in the solid form, either in loose particles, or enveloped in coagulated mucus, or in little clots of blood, or wrapped up in the more solid parts of the contents. It may be often found adhering to the coats of the stomach, either scattered in the form of fine dust, or collected in little knots. The particles are covered by mucous, surrounded by redness of the membrane; or by effused blood, or imbedded in little ulcers. It sometimes exhibits a yellow surface, from its conversion into the sulphuret.

It must not, however, be supposed, that every white powder, found lining the inside of the stomach, is arsenic. Not only may other white powders find entrance, but white pulvurulent scales resembling powdered arsenic, but composed of animal matter, are occasionally formed on the mucous coat of the stomach and intestines:

8. When the stomach has been much inflamed, the redness may extend to the mucous membrane of the intestines. Traces of inflammatory action are seldom found in the small intestines, or lower down than the extremity of the duodenum, not often affecting the colon. But the rectum is at times found much inflamed:

9. In the cavity of the chest, are sometimes found redness of the pleura, redness and congestion of the lungs, redness of the inner surface of the heart, and redness of the lining membrane of the windpipe:

10. The organs of generation are found occasionally affected—the penis and labia being distended and black:

11. The conjunctiva of the eyes frequently presents vascularity, and spots of extravasation:

12. It was once affirmed that bodies, poisoned by arsenic, passed more rapidly into decay than other bodies; but this is now very clearly settled to be so far from being true, that it actually, in many cases, has been found to possess antiseptic properties. The circumstances under which it proves to be a

good preservative of animal textures appear to be, when there is a direct application to them in sufficient quantity. Hence its antiseptic qualities will generally be found exerting themselves upon the stomach, and, perhaps, also on the intestines, leaving the rest of the body to decay in the usual manner. Owing in part to this quality, and to the fact that it is not easily decomposed and resolved into new compounds, it has often been detected in the stomach, or some parts of the system, long after interment. In one case, it was detected thirteen months, in another fourteen, and in another still, seven years after interment. In a case recently occurring, mentioned in a London paper, it was proved that two children had been poisoned with arsenic, from examination of their bodies after eight years interment. Mr. Herepath, in giving his testimony on the trial, said, "I wish it to be circulated throughout the country that years have no effect in removing traces of arsenic. The roots of trees, as large as my little finger, had passed through the head and skeleton, and followed the bones in all directions. I found arsenic in the bones, in the black mould under the head, and a great quantity in the black mould under the ribs. I have never found arsenic in the body which was in a natural state. I mention this to correct the ridiculous notions which have gone abroad, owing to some sayings which have been attributed to the French chemists. Raspail is reported to have said, that he could produce arsenic from the legs of chairs; and Orfila that he could do so from the common soil. I have made experiments on hundreds of bodies of human beings and brutes, but have never discovered arsenic unless it had been administered mechanically or for criminal purposes."

In regard to the force of the evidence derived from post-mortem appearances alone, Dr. Christison sums up by saying, that "mere redness, conjoined or not, with softness of the mucous membrane, may justify suspicion only. But if there should be found in the body of a person who has died of a few days illness, redness, black warty extravasation, and circumscribed ulcers of the villous coat of the stomach, effusion of blood or bloody clots among the contents of that organ redness of the intestines, more especially redness and ulceration of the colon and rectum, and redness of the pharynx, or of this along with the gullet; the proof of poisoning with some irritant will amount to a strong presumption." 332.

MERCURY.

Mercurial preparations offer very interesting subjects of enquiry, but are less frequently resorted to for the purpose of destroying life than arsenic. Still some of them are occasionally made use of for that purpose, and hence become subjects of medico-legal investigation. All the remarks on the subject of Mercury may be included under the following heads:

1. Its preparations:
2. Its tests:
3. The symptoms it develops:
4. The post-mortem appearances it produces:
5. Its treatment.

1. Its preparations. Although there are several different preparations of mercury, yet two of them are of vastly more importance than the others, viz., the bichloride, or corrosive sublimate, and the protochloride, or calomel. Of these two, the first is altogether the most important to be investigated in a medico-legal point of view, as it is this preparation which is the most productive of fatal results. Calomel is seldom given with the direct design to destroy life.

2. Its *tests*. These are somewhat different, as they have application to the corrosive sublimate, the most active of mercurial poisons, in a solid state, in solution, or in organic liquids. A small quantity, in the solid form, is first heat on platinum foil, until it becomes completely volatilised. A few drops of liquor potassæ changes it to a yellow color; hydro-sulphuret of ammonia, to a black; and a solution of iodide of potassium, to a bright scarlet. It is also recommended to mix one part of the poison, with three or four parts of calcined carbonate of soda, to place the mixture in a reduction tube, and to apply the heat of a spirit lamp, having previously dried the upper part of the tube. The result will be the formation of a ring of globules on the cool sides of the tube. *Guy's Principles of Forensic Medicine*, 610.

When in solution, there are several tests that may be made use of. Such as, 1. Potash; 2. Protochloride of tin; 3. Sulphuretted hydrogen gas; 4. Precipitation by metals; and 5. The galvanic test. It is hardly necessary to dwell on these tests. There are various ways of applying the last mentioned. It may be done by twisting a slip of zinc round a slip of bright copper, and introducing them into the solution. Mercury is deposited upon both. *Taylor's Med. Juris.*, 147.

In organic liquids, it cannot always be found in a state of solution. It is decomposed and precipitated by many organic principles, such as albumen, fibrin, mucous membrane, as well as by gluten, tannin, and other vegetable substances. There are several tests by which its presence can be satisfactorily made known, but the galvanic is that which seems to be the most effectual, as it is capable of detecting the presence of mercury in exceedingly small quantities. For the purpose of applying this, cut a slip of fine gold foil, of about an inch in length and an eighth of an inch in width, just large enough to enter into a small reduction tube. Twist around this, in a spiral form, a narrow slip of finely laminated zinc; then acidulate the suspected liquid with a few drops of diluted muriatic acid, and suspend the gold and zinc by a thread in the midst of it. If mercury is present, and in proportion to its quantity, the gold will be coated of a gray color, either immediately, or in the course of a few hours. If at the end of five or six hours, the gold remains undimmed, the fair inference is, that no mercury, or none of the slightest consequence, is present. The bright, yellow color of the gold renders it easy to see whether there is any deposition upon it or not, as if there is, that color will be tarnished. *Taylor's Med. Juris.*, 149.

All that can properly be required of the medical jurist, in applying these, or any tests, is to detect the presence of mercury in the system. How it came there, whether administered as a medicine, or given as a poison, must depend on other circumstances. To solve such questions, recourse must be had to the testimony of the physician, to the character of the symptoms, and the morbid appearances after death.

3. The symptoms it developes during life.

These are extremely diversified, more so than those of any other poison. It acts on a number of important organs. In large doses, it corrodes the stomach, paralyses the heart, and results in a rapid death. It is an active poison to whatever part or tissue of the body it is applied. In this respect, it resembles arsenic. It also resembles it in another respect, and that is, its singular power of inflaming the stomach and intestines, whatever be the method of its introduction into the system. It may act, therefore, by corrosion, when introduced into the stomach, or, if introduced into the system through a wound, or any other less direct means than swallowing, it may cause irritation both of the stomach and rectum; also inflammation of the lungs, depressed action, and perhaps inflammation of the heart, oppression of the functions of the brain, and inflammation of the salivary glands.

Whether mercury has been detected in the solids and fluids of the body, has been asserted by some and denied by others. There are now so many facts bearing upon this subject, that it would seem to be fairly settled in the affirmative.

In the case of a gilder, where there was an eruption of little boils, each was found to contain a globule of quicksilver. In another, fluid mercury was passed by the urine.

Metallic mercury has been discovered in the bodies of persons who have undergone a long mercurial course recently before death. A skull, found in a church-yard, contained running quicksilver in the texture of its bones. In another body, mercurial globules were found lying on the os hyoides, laryngeal cartilages, frontal bone, sternum, and tibia. On scraping the periosteum of several of the bones of a man who had labored under syphilis, minute globules were seen issuing from the osseous substance. Mercury has also been obtained by boiling the bones of those who had been long under a mercurial course.

The results of actual chemical analysis have been somewhat contradictory. Zeller has detected it, after death, in the blood and bile; Cantu has obtained it from the urine; Buckner has found it in the blood, saliva, and urine; and Schubarth has also extracted it from the blood. *Christison on Poisons*, 366.

It would appear from these facts to be well established, that mercury, under some circumstances, is found to be present both in the solids and fluids of the body, which, during life, has been subjected to its action.

There are three varieties of symptoms which result from poisoning with the different preparations of mercury:

1. In the first, the leading symptoms, and those to which all the others have a direct reference, are a violent irritation of the alimentary canal. The effects which result from this irritation are very similar to the symptoms caused by poisoning with arsenic. There is vomiting, pain in the pit of the stomach, often extending over the whole abdomen, and profuse diarrhœa. But there are several points that serve effectually to distinguish between the two:

1. In the taking of corrosive sublimate, the symptoms begin much sooner than those caused by arsenic; the irritation in the throat occurs immediately on swallowing; its effects in the stomach commence also immediately or very soon afterwards:

2. The taste is sufficient to distinguish; it is nauseous, metallic, and styptic, while that of arsenic is sweetish:

3. The greater solubility of mercury, and its stronger chemical operation on the animal textures, enable the corrosive sublimate to act very much more powerfully on the throat than arsenic, creating a tightness and burning there, which often continue throughout the whole duration of the poisoning:

4. It generally produces a different effect upon the countenance, and instead of rendering it pale and ghastly, gives it a flushed, and even swollen appearance:

5. As it is the more powerful irritant of the two, it gives rise, much more frequently than arsenic, to discharges of blood by vomiting and purging:

6. It causes irritation of the urinary passages more frequently than arsenic. This consists in frequent and painful micturition; but at times, the secretion of urine is suppressed:

7. It is more apt, than arsenic, to cause nervous affections

during the first or inflammatory stage; there is more of a dozing tendency, more tremors and twitches of the extremities, and so great a degree of stupor, that it sometimes approaches to absolute coma:

8. Its effects upon the system are much more curable than those of arsenic:

9. Deviations from the ordinary course and combination of the symptoms, are rarer met with in the case of corrosive sublimate, than in those of arsenic. *Christison on Poisons*, 372.

Taking all these things into consideration, it is no difficult matter to distinguish cases of poisoning with corrosive sublimate, from those of poisoning with arsenic.

The matter vomited, or discharged by purging, is a stringy mucous, or bilious matter, which often contains blood. The entire abdomen becomes distended, and extremely painful; the pulse is full, quick and frequent, when the countenance is flushed and swollen; but in occasional cases, where the latter is pale and collapsed, it is small, frequent and intermittent. There are sometimes intervals of greater ease, when drowsiness is generally present; the tongue is white and shrivelled, the skin cold and clammy, and the respiration difficult. When death occurs, it usually takes place either during a fainting fit, or in the midst of strong convulsions, or during a state of protracted insensibility. The ordinary duration of life in fatal cases, is from twenty-four to thirty-six hours. It has sometimes continued three days. The shortest duration on record is two hours and a half. *Christison*, 374.

This variety of poisoning with mercury takes place only in those cases in which considerable doses of its soluble salts have been taken, particularly corrosive sublimate.

2. In the second variety of poisoning with mercury, the symptoms begin much like those already mentioned, irritation in the alimentary canal being among the first witnessed. To these, however, succeed the symptoms of what is called mercurial erethysm, the leading affection of which is inflammation of the organs in and adjoining the mouth, more especially of the salivary glands. These symptoms are seldom developed sooner than

the beginning of the second day, and more usually, they do not commence until its close.

The various questions connected with mercurial erethysm, or ptyalism, will be discussed under the third variety.

The following case, found in Christison, 376, will illustrate this second variety of symptoms: A stout young girl, soon after supper, swallowed a drachm of corrosive sublimate, dissolved in beer. In a few minutes after, she was found on her knees in great torture. She had a sense of burning in the stomach, extending towards the throat and mouth, soon followed by violent vomiting of a matter at first mucous, afterwards bilious and bloody; also by purging a brownish, fetid fluid. There was suppression of urine, and much tenderness of the urethra and bladder. The pulse was small, contracted, and frequent; the countenance anxious; and the stupor considerable, interrupted frequently by fits of increased pain. All these symptoms were developed in four hours. Subsequently, the pain in the stomach became much easier, but that in the throat much worse. In the course of the second day, the teeth became loose, the gums tender, and the saliva more abundant than natural. Profuse ptyalism and great fetor of the breath ensued, and she expired towards the close of the fourth day.

This variety is caused by the same preparations of mercury that produce the first.

3. In the third variety, come to be considered all the forms of what is called mercurial erethysm, embracing all the secondary and chronic effects of mercury. Here arise several questions of importance, which the medical jurist may be called upon to settle:

1. By what preparations, how large a dose, and within what time, is mercurial erethysm produced?

Any mercurial preparation may give rise to the secondary effects of mercury. It most frequently results from its milder compounds, such as calomel, which are either given medicinally, or applied continuously to the bodies of workmen who are exposed by their trade or occupation to its fumes. It is most generally the result of repeated small doses, but may be produced by a single dose. When it proceeds from a single dose, it usually commences between the beginning of the second and the end of the third day. It is to be observed, that there is a vast difference between different constitutions, in regard to susceptibility to the action of mercury. Children are generally less susceptible than adults, and robust than delicate persons. Where the nervous system is affected, smaller doses produce more marked effects. *Guy*, 614.

In cases of extreme sensibility to the action of mercury, salivation has resulted from one or two small doses even of the mildest preparations. Fifteen grains of blue pill, taken in three doses, one every night, have excited fatal salivation. Even two grains of calomel have caused ptyalism, extensive ulceration of the throat, exfoliation of the lower jaw, and death. *Christison on Poisons*, 379.

On the other hand, it is equally true, that some constitutions resist the action of mercury, so as hardly to appear capable of salivation at all.

It is rare that mercurial salivation commences within twenty-four hours. In one case, it commenced in four hours; in another, in three, which is the shortest period on record. *Guy*, 616.

Fully as important a question to be settled, is the length of time that may elapse after the administration of mercury has been abandoned, before its effects on the salivary glands and mouth commence. Mercury is a cumulative poison when given in small doses. It may silently accumulate in the body for some time before its symptoms break forth. One case is given, where the interval was three months. Other instances are reported, where the interval was several months. *Christison on Poisons*, 383.

2. What are the symptoms that characterize mercurial erethysm?

Its usual commencement is with a brassy taste, and tenderness of the mouth, accompanied or succeeded with swelling, redness, and subsequent ulceration of the gums, and peculiar fetor of the breath. An augmentation is also observed in the flow of the saliva, which is commonly accompanied with fullness around the lower jaw. The symptoms vary considerably in their severity. In the milder forms, there is only the brassy taste, tenderness of the mouth, redness of the gums, and fetor. In those which are severe, the salivation is profuse; the face, neck and tongue swollen; the inside of the mouth ulcerated or gangrenous. There may also be more or less constitutional disorder, frequent pulse, hot skin, and other symptoms of fever.

3. What is the duration of mercurial ptyalism?

This is extremely variable. The ordinary time may be stated to be two or three weeks. But from that it may extend to almost any possible duration. In one case, it continued inveterately for a whole year; in another, it continued for six years. These, however, are extraordinary instances.

4. Is there danger of confounding mercurial salivation with any other affection?

Mercurial preparations are not the only substances that excite a preternatural flow of saliva. Preparations of gold, of copper, of antimony; also of croton oil and foxglove, have been known to produce this effect. The salivation itself may also form an idiopathic disease, and may be both profuse and obstinate. Several cases of this kind are related by *Dr. Christison*, 380–81. It may even be produced by the influence of the imagination. It is generally easy to distinguish the real effects of mercury from the affections resembling them, if the examination be made in the first stage. The real effects are preceded by the coppery taste and fetor of the breath, and are accompanied by redness, sponginess, and ulceration of the gums. These are wanting in the affections alluded to. In the more advanced stages, there is much more difficulty in discriminating. *Guy*, 615; *Christison on Poisons*, 382.

5. Is mercurial erethysm ever intermittent? Can it cease and recur, without the renewed use of the mercurial preparation? This enquiry actually arose in the case of *Miss Butterfield*, tried in 1775. *Taylor*, 141. The charge was, the administering corrosive sublimate. The defence, that the salivation might have been simply the renewal of a previous ptyalism, which had been brought on by a common mercurial course, and had ceased two

months before the second salivation began. There was a difference of opinion among the witnesses; but one testified that intermission was very common in the London Lock Hospital, and that in one case, the interval was three months. The prisoner was acquitted.

The instances of well settled intermissions must, however, be rare, and are rather among the number of possibilities than probabilities. Dr. Reese, in his Notes on Cooper, mentions, as a peculiarity of mercurial action, that when salivation has been arrested after an interval of weeks, or even months, it may be renewed by the slightest doses of mercury. One interval is mentioned of several weeks; another, of four months; and another still, of six months.

6. In what manner does mercurial salivation prove fatal? It may prove so—

1. From extensive spreading gangrene of the throat, mouth, face and neck. When this is the cause of death, it begins in the mouth or throat and spreads from that till it reaches the face:

2. Death may take place from exhaustion, from discharges of saliva, without material injury to the mouth or adjoining organs:

3. It may be owing to exhaustion from laryngeal phthisis, and may take place suddenly, from suffocation.

There is still another class of ailments, flowing from the secondary effects of mercury, the consideration of which should constitute an important branch of medical police. This embraces the shaking palsy, or mercurial tremors, which so generally affect miners, gilders, and others whose trade exposes them to the operation of this poison. The shaking palsy, caused by mercury, generally begins by an unsteadiness of the arms, next a quivering, finally, tremors, becoming more and more severe, till they resemble convulsions, and render walking, speaking, or even chewing, a matter of much difficulty. If the exposure is continued, there occurs loss of memory, sleeplessness, delirium and death. Attending the trembling, are, a brown tint of the body, dry skin, flatus, and slow pulse. The tremors are generally not difficult of cure, although requiring considerable time.

In whatever way mercury is introduced into the system, it always acts as a poison. The most common and dangerous way, is its introduction into the stomach. There it irritates, inflames, and usually corrodes the alimentary canal, or causes mercurial erethysm. It does not generally occasion dangerous symptoms when applied to a wound or ulcer; although when applied in a diluted state, to sores, it has been known to cause bad effects, if too long persevered in. The system may be brought under the poisonous action of mercury by introducing its preparations into the lungs. The most effectual method of doing this, is the inhalation of its preparations in the form of vapor.

Corrosive sublimate, incautiously sublimed, has caused very serious effects. Even the long continued inhalation of vapors, arising from metallic mercury, has been productive of bad consequences. An event, illustrating this, occurred in 1810, when several bags, containing quicksilver, were burst and the mercury spilled on two English vessels, which were on their voyage home from Cadiz. The result was that the whole crews of both vessels were salivated, some severely, two died, and many were dangerously ill. The rats, mice, cockroaches, cats, dogs, goats and sheep were all destroyed. *Christison on Poisons*, 391.

The soluble preparations of mercury will excite mercurial action when placed in contact with the skin. Even the mere carrying of mercurial preparations, for a length of time, near the skin, although not in direct contact with it, may communicate the poison to the system. The following case, very curious in its details, will illustrate this. A man became affected with a violent salivation evidently mercurial, but which, during his life, could be traced to no real cause. It proved fatal, and after his death, a little leathern bag, containing a few drachms of mercury, was found hanging at his breast. It was then discovered that he had been in the practice of carrying this bag for six years, as a protection against itch and vermin, and had several times renewed the mercury during that period.

Mercury, in the metallic state, is inert and harmless. The sulphurets of mercury are also harmless. The bichloride, or corrosive sublimate, is the most poisonous. The red precipitate and turbith mineral, as well as the white precipitate, act as irritants. The protochloride or calomel, is also an irritant, but is the most manageable of all the preparations of mercury for producing ptyalism. In large doses, it has produced death by its irritant operation.

In reference to the strength of the evidence derivable from the symptoms, it should be remarked, that in a case of sudden death from poisoning with corrosive sublimate, the symptoms alone would furnish but slight proof, but in such case the poison would generally be found in the stomach. To justify the conclusion that some preparation of mercury has been taken, there should be a concurrence of the following circumstances:

1. A strong, acrid, styptic, metallic taste on swallowing the suspected substance:

2. The almost immediate occurrence of a sense of heat, pricking, or tightness, in the throat:

3. The common characteristic signs of poisoning with the irritants, making their appearance in the usual time, and attended with the discharge of blood upwards and downwards:

4. The accompanying or following these signs with a true mercurial salivation.

4. The post-mortem appearances it produces.

These appearances have a general resemblance to those caused by other irritant poisons, their peculiarities arising mostly from the greater solubility of this poison, and its stronger irritant action. To these is owing the fact, that the mouth and throat are much more frequently found affected than in cases of poisoning with arsenic. There is, in case of poisoning with corrosive sublimate, a peculiar shriveled appearance of the tongue, and a great enlargement of the papillæ at its root. The alimentary canal is more generally disordered, and that disordered condition reaches a greater height before death. The throat, stomach, gullet, rectum, and even the colon, are very generally found affected, so much so, that the coats of the stomach and intestines are frequently destroyed. The kinds of destruction the most common are corrosion and ulceration, the first of which results from chemical decomposition, and the last from organic action under the influence of the poison. The first is seldom witnessed on account of its liability to be ejected in vomiting and its solubility and facility of decomposition in the contents of the stomach, and is never found unless the corrosive sublimate be given in large quantity, and in a dose that is very concentrated. In cases which have ended fatally in eleven and twenty-four hours, the corrosion was black, and is described as being "like the charring of leather with a red hot coal, and the rest of the stomach scarlet red or deep rose-red." *Christison on Poisons*, 403.

When the poisoning takes place slowly, the disorganised matter sloughs away, leaving an ulcerated cavity. If examined before the slough is thrown off, the disorganised tissue yields mercury by chemical analysis. If the disorganised part has sloughed off, and been discharged, the ulcer left will be distinguished by signs of surrounding reaction.

The corrosive sublimate is not so likely to be found in the stomach as arsenic. Its solubility is much greater, and hence it adheres with far less obstinacy to the villous coat of the stomach, and is more liable to be discharged by vomiting. It may also be decomposed by its contact with the mucous membrane, or with the matters contained in the stomach, or with the antidotes taken. Iron, zinc, and other metals, are the most effectual agents in promoting such decomposition. Whenever it takes place from the operation of any cause, there can generally be found a deposition of mercury in a state of minute division on the lining membrane, as a thin slate colored covering, which may serve to identify the poison. *Christison*, 405 ; *Guy*, 621.

When mercurial salivation has taken place during life, the mucous membrane of the mouth will be found inflamed or sloughing.

In cases of poisoning with corrosive sublimate, the urinary organs, particularly the kidneys, are often found in an inflamed state, and the bladder much more contracted than natural.

The evidence derived from this source can never amount to anything more than a strong presumption or probability. "If the gullet, stomach and colon be all inflamed and ulcerated, and these injuries have taken place during a short illness, the presumption in favor of some form of irritant poisoning will be strong. And the presumption of poisoning with corrosive sublimate will be strong, if the usual marks of salivation are also found in the mouth and throat." *Christison*, 407 – 8.

5. Treatment.

If vomiting be not already present, it should be induced by the exhibition of emetics. *Taylor's Med. Juris.*, 144. But if the poison cannot by these, or any other means, be expelled, there are antidotes that may be administered generally with great success. The most important of these is albumen in the form of white of eggs, beat up with water. This has the effect of destroying the corrosive properties of the bichloride of mercury, by converting it into the protochloride of mercury and albumen. It is said the white of one egg is required to render four grains of the poison innocuous.

Another remedy is gluten. This may be used as a substitute for albumen, when that is not readily attainable. The gluten contained in wheat may be successfully employed. Wheat flour, mixed with water or milk, should be administered.

When neither albumen nor gluten is at hand, milk may be administered. Also iron filings are recommended, the iron acting by reducing the corrosive sublimate to the metallic state.

There are several other metallic compounds, besides arsenic and mercury, that are included in the class of irritant poisons. Thus copper, lead, antimony, zinc, tin, silver, iron, bismuth, and chrome are all, when taken internally, more or less active poisons. It is, however, so extremely seldom that the medical jurist is called upon to give any results of the knowledge he may have acquired in reference to these substances, with the exception of the two first mentioned, that it seems hardly proper to expend much time upon them. In regard to the exceptions mentioned, the occasions must be very unfrequent when he may be called upon to give any information. Still in reference to them a few words may properly be said.

COPPER.

The salts of copper are seldom resorted to by any one for the purpose of poisoning others. Their deep color, and strong disagreeable taste, render it difficult to administer them secretly. The same reasons prevent them from being often taken accidentally. They are occasionally used by the suicide. The use of copper utensils in cookery may also lead to the accidental admixture of these salts with food.

All that it is deemed important to say, in regard to this metal, may be embraced under—

1. Its compounds or salts :
2. Its tests :
3. The symptoms it developes :
4. The post-mortem appearances it causes :
5. Its treatment :
6. Its use for culinary, and other domestic purposes.

1. Its compounds. The pure metallic copper is not poisonous, being in this respect similar to mercury and arsenic. Many persons have swallowed copper coins, and retained them for weeks without any symptoms of poisoning. All its salts are poisonous. Of these there are several, but with the exception of two, they are seldom met with. These two are the sulphate, well known as blue vitriol, and the subacetate, known as verdigris. The first is found in the form of large crystals of a deep blue color, and having an acrid, astringent, and metallic taste, and is known in common language as blue stone, blue vitriol, or blue copperas. The other is a common pigment, met with in the form of a light powder, of a greenish blue color; of a peculiarly disagreeable smell, which approaches to that of vinegar. This last is the salt which the most frequently produces deleterious effects.

2. Its tests. Without going into an enquiry in relation to all the tests of copper, I shall merely invite attention to two, calculated to discover its presence in organic mixtures. These are both stated by Mr. Taylor, 170-71. They proceed upon the principle, that a portion of the poison is held in solution. Before applying any test, the color of the liquid is to be particularly noticed. If it contain any salt of copper, it will exhibit a decidedly green color.

The first test is very simple, and consists in thrusting into the liquid, a zinc and platina needle. If any salt of copper be present, in a few hours it will be coated over with the metal. To have this test succeed, the needle must be bright, and not rusty. The smaller the quantity of copper in the liquid, the longer will the needle be required to remain, because the slower will be the formation of the coat. This will succeed, notwithstanding a large quantity of organic matter may be present; and a small quantity of the salt of copper may be discovered in tea, coffee, porter or gruel, provided we acidulate the liquid slightly with diluted sulphuric acid, before the introduction of the needle.

The other test is applied by first filtering the liquid, and placing a portion of it in a clean platina capsule or crucible, and then adding to it a few drops of diluted sulphuric acid. A slip of zinc foil is then introduced, and wherever the platina is touched by the zinc, metallic copper is deposited. After coating the platina capsule, the surplus liquid may be poured off, and the capsule well washed out. The metallic copper may then be dissolved out by a few drops of nitric acid with a small quantity of water. By these means, a pure solution of nitrate of copper is obtained, giving the usual reactions with ammonia; and, when the surplus acid is neutralized, with ferrocyanate of potash and polished iron. In this way, copper, if in moderate quantity, may be separated from milk, gruel, porter, or the most complex organic liquids.

3. The symptoms it developes:

These are, in general, much the same as those caused by arsenic, and the most poisonous preparations of mercury. One peculiarity is, that sometimes throughout the whole course of the symptoms, there is a strong coppery taste in the mouth, and a singular aversion to the smell of copper. In the cases related by Orfila, the first symptom was a violent headache, next occurred vomiting and cutting pains in the bowels, and afterwards cramps in the legs and pains in the thighs. Another occasional symptom is jaundice. In cases ending fatally, convulsions and insensibility generally precede death, indicating some injury to the brain.

There are two varieties in the character of symptoms caused by copper. One arises from its local action on the alimentary canal; the other, from its operation on distant organs. *Christison on Poisons*, 432.

In a case in which half an ounce of verdigris, suspended in water, was taken, there was an accession of cholic pains in fifteen minutes, accompanied by profuse vomiting and purging. Eight hours afterwards, the vomiting was diminished, but there was frequent eructation of a matter containing verdigris, some salivation, a small pulse, and blueness about the eyes. In sixteen hours, jaundice appeared. He recovered about the fourth day.

In a case where two ounces were taken, death occurred on the third day, under incessant vomiting and diarrhœa, attended, towards the close, with convulsions, and then with palsy of the limbs. *Christison*, 435.

Other cases clearly show the action of this poison on the brain. In some rather extraordinary cases, narcotic symptoms form the commencement, and irritant symptoms the termination, of the poisoning. When vomiting occurs, the matters vomited have a bluish or green color.

4. The post-mortem appearances it causes:

Where death takes place very soon after swallowing the poison, it is probable no diseased appearances will be perceptible; when death occurs after a longer period, signs of inflammation are present. In one case reported, the skin was yellow, the intestines of an unusual green color, inflamed, and here and there gangrenous. The stomach was green, its inner coat inflamed, and near the pylorus, a spot where the villous coat was thick, hard, and covered with firmly adhering verdigris. The lungs were also inflamed, and the blood firmly coagulated.

5. Its treatment:

The most effectual antidote is albumen There should be a free administration of the white of egg, followed by mucilaginous drinks. Vomiting frequently occurs from the action of the poison. It should be promoted as much as possible, by the administration of warm water, milk, or any mucilaginous drink; and the stomach pump may be used. Sugar has been recommended as an antidote, but it acts very feebly at the ordinary temperature of the human body. Iron filings, suspended in mucilage, have also been recommended.

6. Its use for culinary and other domestic purposes:

It becomes a very interesting subject of enquiry, and one with which the medical jurist should be conversant, how far vessels made of copper may be safely made use of for cooking and other domestic purposes. The substance of the results arrived at on this subject is thus briefly summed up by Dr. Guy, 630:

"Distilled water kept in contact with clean copper, is not impregnated with it. Solutions of several saline matters, as common salt, alum, nitre, and epsom salts, when heated in copper vessels, are found to contain the poison. Acids, and fatty and oily matters, especially when rancid, act still more strongly on copper vessels. One general principle applies to all these substances, which is, that provided the vessels be clean, they may be boiled in them with comparative safety, but cannot be allowed to stand in them without danger. The contact of air with the moistened copper, leads to the formation of the hydrated carbonate, which is dissolved by any acid that the substance may happen to contain. As, however, saline, acid, or oily matters act strongly on copper vessels, it would be well to avoid using such vessels in preparing articles of food containing any of these matters. Milk, tea, coffee, beer, and many of the more common articles of diet, have been boiled in copper vessels without becoming impregnated with the poison. Sulphate of copper has been used to promote the fermentation of dough, to decolorize sugar, and to give a green color to pickles. So also has the arsenite of copper been used to color sweetmeats."

LEAD.

It is very rare indeed that the salts of lead have been made use of for the purpose of intentional poisoning. It is rather in its connections with medical police, that it becomes an interesting subject of inquiry. It is used so much in the arts, and its effects, as a slow poison, are so frequently presented, that the medical jurist must feel under the necessity of making himself acquainted with it. All the remarks to be submitted in relation to this substance, may be embraced in considering—

1. Its compounds or preparations:
2. Its tests:
3. The symptoms it developes:
4. The post-mortem appearances it causes:
5. Its treatment:
6. Its use for culinary and other domestic purposes.

1. Its compounds or preparations:

The metal itself possesses no poisonous properties. As it is readily acted on by acids, it cannot be taken into the stomach without hazard, as it may become poisonous by combining with its contents. The compounds of lead, which are of the most frequent use in the arts, are litharge, red lead, white lead, sugar of lead, and Goulard's extract. The three first are much used by house painters and glaziers, and the two last, extensively employed in surgery. The two, however, which the medical jurist is the most interested in becoming acquainted with, are white lead, (which is the carbonate of the metal,) and sugar of lead, (which is the acetate.) The first is exhibited in the form of a heavy snow-white powder, or in white, chalk-like masses; and the second, in the form either of a white, heavy powder, or of aggregate masses of long, four-sided prismatic crystals. The first is insoluble in water, but soluble with effervescence in nitric acid. The second is very soluble in water, has a slight odor of vinegar, and a sweetish astringent taste.

3. Its tests. White lead may be known by its being blackened by sulphuretted hydrogen; by its being soluble with effervescence in nitric acid, while it remains insoluble in water, unless it contain free carbonic acid; and by its becoming permanently yellow when heated to redness, in consequence of the expulsion of its carbonic acid, and its conversion into protoxide.

Sugar of lead, in a fluid state, may be detected, by the following reagents, viz: *Sulphuretted hydrogen*, *chromate of potass*, *hydriodate of potass*, and *metallic zinc*. The first mentioned causes a black precipitate, which is the sulphuret of lead. This acts upon the metal, whether it be in a fluid or solid state. The second causes a fine gamboge-yellow precipitate, the chromate of lead. The third causes also a lively gamboge-yellow precipitate, which is the iodide of lead. The third, in case the solution of lead is not too diluted, if held for some time in it, displaces the lead, taking its place in the solution, the lead being deposited in the form of a crystalline arborescence. *Christison on Poisons*, 473–4.

It must not, however, be taken for granted, that lead, when in combination with animal and vegetable matters, can be detected by the application of each one of these tests.

The salts of lead may be decomposed by vegetable or animal matters, or those matters may alter the action of the re-agents. Many vegetable infusions possess, more or less, the power of decomposing; so also do almost all animal fluids. Where the decomposition is not effected, the color of the precipitate is materially altered. The sulphuretted hydrogen should be excepted from these remarks, as that may be so applied as to detect lead in all possible states of mixture. *Christison*, 475.

Accordingly, to detect the salts of lead in organic liquids, the method prescribed is to "add to the suspected liquid a little nitric acid, to boil, and then filter it; to transmit sulphuretted hydrogen gas through the filtered liquid. If a salt of lead be present, a black precipitate will be formed. If no precipitate falls when the liquid is treated in this manner, collect the solid matters remaining on the filter, incinerate, dissolve the ash in nitric acid, dilute and filter the resulting liquid, and transmit the sulphuretted hydrogen gas as before." *Guy*, 633.

If a black precipitate is thus obtained, it may be proved to contain lead, either

1. By placing the dried precipitate on a fragment of charcoal, and reducing the metal by the blow-pipe: or,

2. By exposing the sulphuret to a red heat in a tube open at both ends, to burn off the sulphur, treating it with strong nitric acid, and diluting the resulting solution with distilled water; then filter the solution, evaporate to dryness, and gently heat in order to expel the excess of nitric acid. Dissolve the residue in

distilled water, and it will give the characteristic reactions of lead. *Guy*, 633; *Christison*, 504.

3. The symptoms it developes:

It has been a matter of considerable controversy, whether lead is to be found in the fluids and solids of men and animals who have died of it, or have labored under its effects. The result seems to be, that some have been able to detect it, while others have failed to do so. The positive evidence of those who have detected it, would seem to establish the fact, that it is occasionally found in animal fluids and solids. *Christison on Poisons*, 507 – 8 – 9.

Although all the preparations of lead are poisonous, except perhaps the sulphuret, yet it seems probable that irritant poisoning can only be produced by those compounds which are soluble, such as the acetate, sub-acetate, and nitrate.

The preparations of lead produce in man three kinds of symptoms: One indicates inflammation of the alimentary canal; another, spasm of its muscles; and a third, injury of the nervous system, apoplexy or palsy. Each of these may exist independent of the other.

The acetate of lead, in large doses, either gives rise to symptoms of simple irritation, or to those of inflammation, united with the spasmodic cholic of lead. The different preparations of lead are weak irritant poisons, and require to be given in large doses to produce any symptoms immediately dangerous. The most interesting cases of poisoning by lead, are those which are induced slowly, by the long continued use of its preparations, which have been gradually introduced into the system, in minute quantities. Hence results the painters' colic, or colica pictonum, and lead palsy.

The former may be divided into two stages, of which the first consists in an affection of the alimentary canal, and its leading feature is a severe colic. The uneasiness, at first confined to the stomach, soon stretches through the whole abdomen; cramps commence in the pit of the stomach, which soon extend to the rest of the abdomen. The pain is sometimes constant, sometimes subject to intermissions. It is generally relieved by pressure. The abdomen is hard, the abdominal muscles contracted, and the navel is often drawn in so as almost to touch the spine. A great degree of costiveness generally prevails, there being either no discharge, or one consisting of scanty knotty fæces. The effect on the urine is to diminish it, but the saliva is increased in quantity, and observed to possess a bluish color. *Christison*, 513 – 14.

The limbs are generally racked with cutting pains, either from the beginning, or after a few hours or days. The countenance appears dull, anxious and gloomy; the skin becomes bedewed with a cold perspiration; the breathing quick and catching; the pulse sometimes accelerated, but more generally retarded.

This first stage may terminate in three ways. The first is in a recovery, the same as from an ordinary colic; and if it be the first attack, it is likely, under judicious management, to terminate in this manner.

A second termination occurs in violent and neglected cases, in which the colic in a few days becomes attended with giddiness, great debility, and torpor. The torpor sometimes deepens into coma, attended with convulsions, from which very few recover.

A third termination takes place in the departure of the colic, leaving the patient in a state of extreme debility, which amounts to a partial palsy, more or less complete. The palsy affects chiefly the upper extremities, and is attended with excessive muscular emaciation. It is of a very peculiar character. The loss of power, as well as of substance, prevails to the greatest extent in the muscles which supply the thumb and fingers, the extensors suffering much more than the flexors. The paralysis is hardly ever complete, the hands are constantly bent, except when the arms hang straight down by the side. Whenever the patient moves, they dangle loose. He is unable to extend them, or to raise one without the aid of the other. He has racking pains in the limbs and arms, and feeble digestion. From this state, restoration is possible, but a fresh and fatal attack is likely to supervene from a fresh exposure.

The habitual application of lead to the body, whether by inhaling its fumes; by the continuous contact of its compounds with the skin; by the using them for a long time as medicines, or applying them as unguents and lotions; and the introduction of them for a length of time with food, may all sooner or later produce the colica pictonum. *Christison on Poisons*, 516.

Those who are the most subject to it are—

1. Miners of lead. They are less liable since the employment of proper precautions for removing the danger:

2. Manufacturers of litharge, red lead, and white lead:

3. House painters, on account of the preparations of lead contained in the paints made use of by them:

4. Plumbers, sheet lead manufacturers, and lead pipe makers:

5. Glass blowers, glaziers and potters, who use the oxide of lead in their respective manufactures. These last are not generally subject to it.

The disease can generally, if not always, be avoided by a resort to prudential measures, among which is the enforcement of cleanliness. The substitution of moist for dry grinding of lead, has had the effect greatly to diminish the amount of the disease.

There is one symptom which is said to be characteristic of the action of lead on the system, and one that is rarely absent where marked symptoms of lead poisoning are present, and that is *a blue line on the gums around the margin of the teeth. Guy's Principles of Forensic Medicine*, 634.

4. The post-mortem appearances it causes. In one case of acute poisoning by a compound of lead the following were the morbid appearances:

The lower end of the gullet, the whole stomach and duodenum, a part of the jejunum, and the ascending and transverse colon, were greatly inflamed. The villous coat of the stomach appeared as if it had been macerated. The stomach contained six ounces of a reddish brown fluid, which had a sweetish, styptic, metallic taste, exhaled the odor of vinegar while evaporating, and yielded globules of lead when the dry residue was subjected to the process of reduction. *Christison*, 521.

In colica pictonum there are no appearances of inflammation presented. Its peculiarity consists in an unusual constriction of the large intestines. The mucous coat is generally found healthy, the disease probably affecting the muscular coat only. Sometimes no morbid appearance is presented. In lead palsy the affected muscles are found pale and flaccid, and when the disease has been of long continuance they resemble white fibrous tissue. *Guy*, 635.

5. Its treatment. The antidotes to the compounds of lead are the soluble alkaline or earthy sulphates. The sulphates of soda or magnesia should be freely administered, dissolved in water. Vomiting should be excited by the sulphate of zinc, and warm water should be given. Also milk and white of eggs. The phosphate of soda is also an antidote.

6. Its use for culinary and other domestic purposes. Lead has been extensively used in the construction of pipes and cisterns for conveying and holding water. Ill effects have sometimes resulted from its use. It becomes, therefore, important to ascertain what kind of action air and water exert upon the metal. Air tarnishes lead from its oxidation, and also from the formation of a thin crust of carbonate of lead. In relation to water it seems settled that distilled water, deprived of all its gases by boiling, and excluded from the air, has no action on lead. When distilled, or very soft water, is placed in contact with lead, the air having also free access, a white powder collects around the metal, which continues to increase, until white, pearly scales are formed, which either float or fall to the bottom of the vessel. *Guy*, 635. Various saline substances held in solution in the water prevent the formation of this powder, the carbonate of lead. All the neutral salts possess this power, more especially the sulphate of lime. The general result is stated to be—that neutral salts in various, and very generally, in minute proportions, retard or prevent the corrosive action of water on lead; allowing the carbonate to deposit itself slowly, and to adhere with such firmness to the lead, as not to be afterwards removable by moderate agitation; adding subsequently to this crust other insoluble salts of lead, the acids of which are derived from the neutral salts in solution, and thus at length forming a permanent, and impermeable skreen, through which the action of the water cannot any longer be carried on. *Christison on Poisons*, 483.

It will thus be seen, that the danger arising from bringing water into contact with lead increases according to the purity of the water, and to render the use of lead safe, it is necessary to mix a quantity of saline matter with the purer kinds of water. Some kinds of river water contain a sufficiency of saline matter to render the use of lead safe, while some degree of danger always attends its employment to collect or preserve rain or snow water, or even spring water of unusual purity. The danger is much increased by covering the cisterns with leaden lids, as the pure water then rises by a natural process of distillation, and collects on the lid. Rain or snow water for culinary use, should not be collected on leaden roofs, nor preserved nor conveyed in lead.

Whenever, by the contact of some other metal with the lead, or of the solder employed upon it, a galvanic action is excited, it will neutralize all the preservative effects of saline matter. So also the same counteracting power will be exerted by carbonic acid if present in the water. The use of lead at all, in connection with water, must always be attended with more or less danger. *Guy*, 636.

Lead may be dissolved by vegetable acids and fatty substances, and hence acescent fruits, or liquors, or fatty matter, should not be kept in vessels made of that metal, or glazed with its oxide. By these means, sour milk, cider, wine, and rum have come to possess poisonous properties. *Guy's Principles of Forensic Medicine*, 636.

In regard to antimony, there are two of its salts that are poisonous, viz., tartar emetic and butter of antimony. The first is found in the form of a white powder, or of yellowish white efflorescent crystals. The second is a corrosive liquid, of a light yellow, or dark red color; yielding with sulphuretted hydrogen, the orange red precipitate of the salts of antimony.

The tartar emetic in solution is distinguishable from all other metals, by the effect of sulphuretted hydrogen, or hydro-sulphuret of ammonia, which throws down an orange red precipitate. All vegetable substances containing tannin, decompose the salts of antimony.

Antimony is absorbed, and may be found in the secretions, in the blood, and in the solid viscera of the body. A large dose of tartar emetic produces nausea, vomiting, pain and tenderness of the epigastrium, extending to the whole abdomen, constriction of the throat, and severe cramps of the extremities.

The morbid appearances after death are those of inflammation, in various degrees, in the mucous membrane of the stomach, and duodenum.

The best antidote is a decoction of cinchona bark; and when this is not readily obtainable, the powder, or what is more effectual still, the tincture. Also any thing containing tannin, such as tea, or decoction of oak bark may be used as an antidote. *Guy's Principles of Forensic Medicine*, 640.

VEGETABLE IRRITANTS:

This embraces a numerous class of substances, such as aloes, colocynth, gamboge, jalap, scammony, castor oil seeds, croton oil, &c., which are used in small doses as medicines, but which, in large doses, either alone or in combination, may prove fatal. They are seldom resorted to for criminal purposes, and are, therefore, very seldom the subjects of strict medico-legal enquiry. Their mode of action, the symptoms developed by them, and the morbid appearances remaining, are nearly the same in all.

The poisonous property in some plants resides in a pecular resin; in others in a peculiar fecula or extractive matter; in others in an oil; in others in an alkaloid; and in others in a neutral crystalline matter. Some of these principles appear to act through the medium of the blood. Others produce an inflammation of the subcutaneous cellular tissue, and also of the stomach and intestines, without entering the blood. *Christison on Poisons*, 536–7.

The symptoms are chiefly those which indicate inflammation of the villous coat of the stomach and intestines. They generally excite vomiting when taken in large doses. There is also not unfrequently a diarrhœa, both being attended by twisting pain of the belly, at first remittent, but becoming more constant as the inflammation becomes more strongly marked. There is often tension, fulness, and tenderness, of the belly. There is generally excessive weakness; sometimes, although not frequently, giddiness, and a tendency to delirium. Tenesmus and strangury are often present, and the patient sometimes falls into a state of collapse.

The morbid appearances are a redness of the stomach, more or less deep, ulceration of its villous coat, redness of the intestines, especially of the rectum and colon, which often exhibit an inflamed appearance when the small intestines are not visibly affected.

The treatment consists in the free use of diluents, in the administration of emetics when vomiting is absent, in local or general blood-letting when the inflammatory symptoms run high, and in stimulants or narcotics if collapse or nervous symptoms are present. *Guy's Principles of Forensic Medicine*, 644.

There is no necessity of dwelling upon the particular poisons embraced in this class. There is one, however, the administration of which has several times been made a matter of judicial investigation. That is the *lobelia* or *Indian tobacco*, which is a violent acrid irritant, and has occasioned several deaths by its improper administration. In the case of the *Commonwealth* vs. *Thompson*, 6 *Mass. Rep.*, 134, the defendant was indicted for the murder of *Ezra Lovett*, by administering *lobelia*. The deceased was simply confined by a cold when he sent for the defendant, who professed to cure diseases upon a new principle, and had several different substances, one of which he called his *coffee*, another *well-my-gristle*, and another *ram-cats*. He commenced by giving the powders of lobelia, which he kept up for several days, until they ceased to operate. He still continued to administer them, until the patient lost his reason, and became convulsed, so that it required two men to hold him. Two more powders were forced down, soon after which he expired.

There was no doubt but that the administration of the drug caused the death of the deceased, but the defendant was acquitted on the ground that no malice was shown, his intention being to cure the patient.

A case also occurred in New-York, in 1837, in which lobelia was administered both by mouth and injection; besides, the power of steam was applied, and large quantities of "composition tea" given. The result of this course was, that inflammation of the stomach, bowels and brain was induced; delirium, with great prostration, took place, and the patient finally sank, exhausted. The defendant was found guilty, and sentenced to fine and imprisonment.

Animal Irritants:

The most prominent on the list of animal irritants is *cantharides.* This has seldom, if ever, been used for the purpose of commiting murder. It has been resorted to as a means of procuring abortion, and given for the purpose of exciting aphrodisaic propensities. The form in which it is administered is either in the state of powder or tincture.

It may frequently be detected in the stomach by its glistening green color. Another method of detecting it is, to dissolve it in ether, evaporate it to the thickness of an extract, and apply it to the skin. If a blister is the result, it affords convincing evidence of its being cantharides.

The symptoms it produces are those of a violent irritant poison. It causes a burning sensation in the throat; pain and great difficulty in swallowing; dryness of the fauces, accompanied by severe thirst; a burning pain at the pit of the stomach, increased by pressure, and extending at length over the whole abdomen; nausea, and discharges of bloody mucus from the stomach, mixed frequently with shining green particles; pain in the loins, tenesmus, strangury, bloody urine, priapisma and swelling, and inflammation of the genital organs. The patient becomes restless, the breathing laborious, the pulse quick and hard. Sometimes headache, delirium and convulsions are superadded. Another occasional symptom is salivation. *Taylor*, 191; *Guy*, 647-8.

In the form of tincture, it has been resorted to for the purpose of removing sexual inability on the part of the male, and even for barrenness in the female. For these purposes, from one to two or three drachms daily have been given, and even to the extent of one ounce within the twenty-four hours, is said to have been taken for several days in succession, and yet to have produced no evil consequences. *Guy's Prin. of Foren. Med.*, 649.

As to the quantity required to produce a fatal result, the smallest quantity of the tincture is one ounce ; but, it seems well settled, that no rule can be laid down as to the quantity that may prove injurious, some being but little affected by large doses, while others are extremely susceptible to the smallest quantity. It will operate as a poison when applied externally to a wound or ulcer.

The post-mortem appearances show an inflammatory state of the whole alimentary canal, from the mouth downwards, as well as of the ureters, kidneys and internal organs of generation. The mouth and tongue have been found deprived of their mucous membrane. The brain has been found in a congested state. The powder has been sometimes found in the stomach for a long period after death ; in one case, after an interment of nine months.

In regard to treatment, there is no antidote to this poison. Vomiting should be excited and encouraged by emetics and warm liquids. Diluents should be used freely, with oily or demulcent injections into the rectum and bladder, and leeches or bleeding, if the inflammatory symptoms run high. *Guy*, 648.

There are some kinds of fish belonging to the irritant poisons. A few are always poisonous, while others are only occasionally so, and others still only affect certain persons. The most common example of the poisonous fish is the common muscle ; which, after an interval of one or two hours, causes an eruption on the skin, attended with intense heat and itching, dyspnœa, extreme weakness, and, in fatal cases, very frequently delirium, convulsions and coma.

The treatment consists in the free use of emetics, cathartics, and diluents. *Guy*, 649. The halibut, crab, lobster, mackerel, &c., have been occasionally known to cause violent attacks of cholera-morbus, or symptoms of acrid, irritant poisons.

Very severe and dangerous symptoms, nearly allied to those of irritant poisoning, have been caused by eating decayed animal matter. Those articles which have the most frequently acted as poisons are sausages, bacon, cheese, and goose-grease. *Guy*, 650. The symptoms rarely come on until after the lapse of three or four hours. They are sometimes accompanied by narcotic symptoms. The poisonous quality of the food developes itself only in the first stage of putrefaction, and disappears when that process is far advanced. "The milk of cattle fed in particular pastures, containing poisonous plants, is said to acquire poisonous properties, just as the honey of bees, which feed on certain poisonous flowers, produces delirium and symptoms of narcotic poisoning." *Guy*, 651.

There are also certain gases that belong to the irritant class of poisons. The most prominent of these are the nitrous acid gas, chlorine, and ammonia. The first mentioned, when in a concentrated state, destroys life by exciting violent inflammation in the lungs. A chronic form of the disease is sometimes produced by its daily inhalation, when mixed with common air, in those who work at brass finishing and water gilding.

The second class embraces the

NARCOTIC POISONS.

Narcotic poisons are all those substances which chiefly or solely produce symptoms of disorder of the nervous system. By entering the blood vessels, they act on the brain or spine, or both. It has been alleged by some, that they produce on the inner coats of the blood vessels a peculiar impression, which is conveyed to the center of the nervous system along the nerves.

The usual symptoms characterizing the action of the narcotic poisons are, giddiness, headache, obscurity or depravation of sight, stupor or perfect insensibility, palsy of the voluntary muscles, or convulsions of various kinds, and at last, complete coma. *Christison*, 607; *Guy*, 654.

The morbid appearances left in the body are generally insignificant. The vessels of the brain are sometimes gorged with blood, the ventricles and membranes containing serosity. Extravasation of blood has been an occasional, although very rare, occurrence.

There are several diseases, the symptoms of which are very liable to be confounded with the action of narcotic poisons. Among these, that which is perhaps the most common is,

Apoplexy.

This disease, with the exception of the nervous or simple kind, arises from congestion or effusion of blood within the cranium. The symptoms common to it, and to some of the narcotic poisons, are a more or less complete abolition of sense, and the power of motion, combined frequently with convulsions.

The means of distinguishing are the following:

1. Apoplexy is sometimes, although not always, preceded by warning symptoms, such as giddiness, headache, ringing in the ears, depraved vision, or partial palsy. The action of narcotics is never preceded by any precursory symptom.

2. Apoplexy attacks men more frequently than women, and generally old persons, or persons over thirty years of age, while narcotic poisoning is fully as much or more likely to occur in the case of young than old persons.

3. Apoplexy is much the most likely to occur among fat people, not that there is perhaps any close connection between the two, but the same circumstances, viz., great strength, vigorous constitution, and good digestive powers, predispose both to corpulency and apoplexy.

4. Where a meal is the exciting cause, the symptoms of apoplexy generally begin immediately after, or not unfrequently, during its continuance. This is rarely the case when the common narcotics have been administered as poisons. An interval of ten, fifteen, twenty, or even thirty minutes, in the case of opium, always occurs. So, also, if the symptoms are delayed beyond one, or at furthest two hours, after anything has been taken, it is hardly possible they can be owing to opium; or if beyond four, to any narcotic poison.

5. The symptoms of apoplexy generally begin abruptly, sometimes commencing at once with deep sopor. Those produced by the narcotic poisons advance gradually, except in the instances of the hydrocyanic acid and the narcotic gases.

6. Apoplexy sinks the patient into so profound a sopor, that it is rarely possible to rouse him to a state of consciousness. In poisoning with the common narcotics, the patient may be roused from the deepest lethargy. A loud voice, or forcible striking, or the injection of water into his ear, is generally sufficient for that purpose.

7. In apoplexy, convulsions are common; in poisoning with opium, very rare. So, also, the countenance is much more commonly bloated in apoplexy, than in the case of narcotic poisoning. The pupil of the eye is dilated in apoplexy, and generally contracted in the case of poisoning with opium.

8. The eighth point of difference regards the duration of the symptoms. Few cases of narcotic poisoning last beyond twelve hours, the most common time in which they prove fatal being six or eight hours. Apoplexy often lasts a whole day, or longer; or apoplexy sometimes proves rapidly fatal, destroying life immediately, or in a few minutes, much sooner than any of the narcotic poisons, except the hydrocyanic acid and the narcotic gases. The shortest period of time in which opium has been ever known to destroy life, is three hours.

There is also considerable difficulty in distinguishing the post-mortem appearances caused by apoplexy, and those produced by the narcotic poisons. There are several different kinds of apoplexy. Of these kinds, *simple*, or what has frequently been called *nervous* apoplexy, occasions death without leaving any sign in the dead body. Its occurrence, however, is very rare, and more especially in those who are in the enjoyment of perfect health. It seldom, if ever, occasions death in less than five hours.

Another kind is *congestive*, which may leave in the dead body no other sign than congestion of vessels within the head. This is also regarded by many as the common effect of narcotic poisons. There is nothing here, therefore, that can be termed distinctive; but it has been remarked, that this kind of apoplexy seldom if ever destroys life, except after an interval of nearly a day at least after its first attack; so that this feature might serve to distinguish.

Serous apoplexy may produce serous effusion on the external surface, or, in the ventricles of the brain. Such effusion is frequently the termination of some inflammatory disease of the brain, but does also occur in connexion with pure apoplexy. When it is preceded by decided apoplectic symptoms, the disease is always of several days duration.

Apoplexy from extravasation leaves its traces in extravasation of blood within the head. This is the most common kind of apoplexy, and is that which narcotic poison rarely imitates. An apoplectic cell, or cavity containing blood in the brain, should not always be set down as the cause of death. A recovery may take place, and the cell nevertheless remain full. It is only when the blood contained in the cell is recent, or when it is surrounded by the signs of recent inflammation, that it may be assumed with certainty to have been the occasion of death. *Christison on Poisons*, 617.

Another disease liable to be confounded with narcotic poisoning, is *Epilepsy.*

In this there occurs an abolition of sense, accompanied by convulsions. The symptoms developed by the hydrocyanic acid, and some of the narcotic gases, bear the nearest resemblance to this disease. Some of the narcotico-acrid poisons also bear, in their effects, a resemblance to the same disease. These are belladonna, stramonium, hemlock, camphor, &c.

The circumstances principally relied upon to distinguish between an epileptic fit and narcotic poisoning, are the following:

1. The epileptic fit is sometimes, but not always, preceded by certain warnings, such as stupor, a sense of coldness, or creeping, or of a gentle breeze proceeding from a particular part of the body towards the head. *Christison on Poisons*, 618.

2. The symptoms of epilepsy begin violently and abruptly; those of the narcotic poisons, with the exception of the hydrocyanic acid, the narcotic gases, and a few rare alkaloids, always begin gradually.

3. In epilepsy, the patient cannot, in general, be roused by external stimuli. In cases of narcotic poisoning, this is almost always practicable.

4. In death from epilepsy, the paroxysm generally lasts long, sometimes more than a day; and, unless there have been several previous fits, it may be said never to prove fatal in less than several hours. The lapse of time, therefore, shows effectually, that the death cannot proceed from hydrocyanic acid or the narcotic gases, and renders it extremely improbable that it is the result of opium.

5. Epilepsy never proves fatal in the first paroxysm. The poison whose symptoms the most resemble epilepsy, is the hydrocyanic acid, and that can be generally detected by its smell.

In relation to morbid appearances, there seems to be none peculiar to epilepsy. The brain, in epileptics, is often found extensively diseased. Tumors may be found in it, excrescences, concretions, or abscesses. The fit may also be produced by irritation in distant organs, as worms in the intestines of children, teething, &c. In some cases, no decided morbid appearance can be found in the body. It is only to cases of epilepsy that prove fatal during the fit, that the attention need to be directed; and few, if any, such cases ever occur without leaving some distinct trace in the organization.

There are other diseases that fasten on the brain, such as *meningitis*, or inflammation of its inner membranes; inflammation, and hypertrophy of the brain itself. But there is little necessity of dwelling upon these. The first is gradual in its progress, well marked, and less rapid than the common cases of narcotic poisoning; and the traces remaining in the dead body, such as effusion of serum, lymph, or pus, will render very obvious the cause of death. There is one form of it, in which the symptoms may lead to some doubt and difficulty, but this is of unfrequent occurrence, and an examination after death will generally disclose the fact whether it be due to such a cause or not.

In common inflammation of the brain, the course is much slower than that of narcotic poisoning, as it seldom proves fatal in less than several days. But to this there are some exceptions where it proves instantly fatal.

There are some diseases of the spinal cord which may resemble narcotic poisoning, but they are exceedingly rare; and, if nothing else, the traces they leave in the dead body are generally a sufficient indication.

To any one who thoroughly examines the subject, it must be apparent, that where all the circumstances are taken into consideration, there can be little difficulty in distinguishing between these several diseases, and a case of narcotic poisoning.

The substances that come under the head of narcotic poisons are derived almost entirely from the vegetable kingdom. The poisonous property they possess, is owing to a peculiar principle which is probably of an alkaline nature, and which slightly differs in each. The principle is an energetic one, and in it is concentrated all the leading properties of the drug from which it is procured. w

Chemical analysis, so much relied upon to disclose the truth in cases of irritant poisoning, is a very inadequate source of evidence in those of narcotic. The reasons are, that the chemical properties of most of the narcotics are not very characteristic; and besides, they are not well developed unless with a larger quantity of the poison than will usually be met with in medicolegal investigations. *Christison on Poisons*, 630.

OPIUM.

This substance not only stands at the head of the narcotic class, but appears to be more frequently resorted to than any other poison. It is the most frequently made use of for the purpose of suicide; occasionally, although seldom, for that of murder. It has been often the source of fatal accidents, and has been employed to induce stupor previous to the commission of robbery. It presents, on many accounts, an interesting subject for investigation, and one with which the medical jurist should become intimately acquainted.

Opium is the inspissated juice of the poppy. Its color is reddish brown; its odor strong and peculiar; its taste bitter and acrid. On account of the latter quality, it cannot easily be administered secretly, and hence the sense of taste is usually deadened by strong spirits before it is administered for the purpose of robbery, theft, or rape. It consists of a number of distinct principles, combined with the meconic acid, with resin, and extractive matters. It is acted on readily by the common solvents. Water and alcohol both dissolve its principles at low temperatures. The mineral and vegetable acids also readily dissolve it.

There are many preparations of opium, the principal of which are its tincture, *laudanum*, containing one grain in every nineteen drops; *wine of opium*, containing one-fifth less than the tincture;

black drop, containing four times as much as the tincture; and *paregoric*, containing opium, camphor, benzoic acid, and oil of aniseed dissolved in alcohol, having only one grain of opium in every half ounce. There are also some other preparations, which it is unnecessary to notice.

There are a number of principles contained in opium, by far the most important of which are *morphia* and *meconic acid.* Through the properties of these, the opium may be recognized, should its own peculiar properties furnish insufficient evidence

The quantity of morphia contained in opium varies from two per cent in the Bengal variety, to nine per cent in some of the varieties obtained from the East Indies. The Turkey opium contains five to ten per cent. This may account, in some degree, for the great difference in the effects that are occasionally produced by particular doses; as its poisonous properties are due to the presence of morphia, existing as a soluble salt and combined with the meconic acid.

The chemical tests for opium are much less satisfactory than those for the irritant poisons. They would even fail altogether in the majority of cases. Few or no traces of opium can be found in the stomachs of those poisoned by it. *Guy*, 664 – 5.

The opium itself is only detected by its smell, and other physical properties, and also by administering it to animals, and witnessing its effects. The smell is peculiar, and many times discloses the presence of the poison. *Taylor's Medical Jurisprudence*, 204.

From some experiments, by which it appears that the intestines of a dog have been paralyzed by applying opium to their mucous coat, and the hind legs of a frog palsied by injecting opium between the skin and the muscles, it is inferred that opium has the power of stupifying or suspending the irritability of the parts to which it is immediately applied. *Christison on Poisons*, 645.

It probably acts constitutionally by entering the blood vessels, and it is by many supposed, that after entering them, it produces on their inner coat an impression which is conveyed along the nerves. It is found to be most of all energetic when introduced directly into the blood. The next method of introduction, by which it acts the most energetically, is when it is applied to the surface of a wound; and the next, when it is introdued into the stomach. These facts would seem to prove that the poison must enter the blood before it acts.

In whatever way introduced, this poison, unlike many others, produces different effects on animals from what it does on man, and even different effects on different tribes of animals. M. Charret announces, as the result of his experiments, that opium produces on animals three leading effects. That one is on the brain, causing a congestion of the blood vessels, inducing a state of sopor; another is on the general nervous center, acting as an irritant, and exciting convulsions; a third is on the muscular system, as a direct sedative. While it is poisonous to all animals, including quadrupeds, birds, fishes, reptiles, and even the mollusca, it does not produce in each the above leading effects. In the class mammalia, with the exception of man, it induced no cerebral congestion, but it acts as an irritant, producing convulsions. In birds, it produces more cerebral congestion, but still its more prominent action is as an irritant and a sedative.

Its effect on man, in a small dose, is at first stimulating. The head feels a sense of fulness, although usually in a slight degree, and the action of the heart and arteries is increased. Its action, in small doses, is, however, by no means uniform in all cases. The stimulus, to some people, is very agreeable, and may be kept up for a considerable time by repeating small doses frequently. Hence the opium-eater, who generally possesses the kind of constitution in which opium developes its effects by rendering more brilliant his imagination, exalting his passions, and increasing his muscular force. *Christison*, 649. In some constitutions, small doses are followed by narcotic symptoms, without any previous stage of excitement.

When taken in large quantities, so as to prove dangerous, there is generally no previous stimulus, the first effects being giddiness and stupor. The latter increases and deepens until the patient becomes motionless and insensible to external impressions. Every appearance indicates the most profound repose, the eyes being shut, and the pupils contracted, the body lying still and the breathing very slow. The features, after a time, become ghastly, the pulse feeble and imperceptible, and the muscles much relaxed. Death, in such case, soon intervenes, unless assistance is speedily obtained. In case it is, and a recovery takes place, a prolonged sleep usually succeeds the sopor, which is followed by nausea, vomiting, giddiness, and loathing of food. *Christison on Poisons*, 650.

One important enquiry regards the time elapsing between the taking of the poison and the commencement of the symptoms. This is very various. It will depend much on the quantity taken, and more still, on the form in which it is taken. When swallowed in tincture, and on an empty stomach, it will, if the quantity be considerable, begin to act in a few minutes. A man having taken an ounce and a half of laudanum, was found completely soporose in half an hour. In another case, after two drachms of solid opium were taken, the sopor fairly commenced in fifteen minutes. When taken in a solid form, however, it does not usually begin to operate under half an hour, or even an hour, from the time it was swallowed. There is good reason to suppose that the time would be considerably extended if, when the opium was taken, the person was under the excitement of intoxication from the drinking of ardent spirits. In one case of this kind, five hours intervened before any material degree of stupor was observable. *Christison on Poisons*, 651.

The sopor which characterizes the action of opium differs from pure coma, in that the patient is generally capable of being roused; but, if roused, he will soon return to his lethargic state unless the exciting power is constantly kept up. If no relief is obtained, it becomes more and more difficult to rouse and restore consciousness, until a state of coma may supervene.

Convulsions are not frequent, but are occasionally present Sometimes, they alternate with stupor; at others, they constitute the most prominent symptom; at times, assuming the form of permanent spasm, which may affect the whole muscles of the body.

Another occasional symptom is delirium, which is of rare occurrence, and may exist either with or without convulsions.

The pulse varies. It is occasionally nearly natural. In the first stage, it is sometimes full and accelerated. Frequently, it is slower, and rather full than feeble. When convulsions occur, it is hurried; and becomes slower as the patient approaches to coma.

The respiration is slow, sometimes even stertorous, but this is not common. More frequently, it is gentle, so much so, that, at times, it can hardly be perceived.

The pupils are sluggish in their contractions, often insensible, contracted, and occasionally to an extreme degree.

The countenance generally has a placid expression, resembling that of sleep. Occasionally, it exhibits anxiety mingled with stupor. It is commonly pale, but sometimes appears flushed.

In regard to the secretions, perspiration is generally promoted, but the excretion of urine and fæces is more commonly suspended. But, although generally there is a constipation of the bowels, yet, in some rare cases, a diarrhœa has been induced.

It may become material, in reference to distinguishing it from natural disease, as apoplexy or epilepsy, to ascertain the ordinary duration of a fatal case of poisoning. This is usually from seven to twelve hours. A recovery generally takes place in those who outlive twelve hours. But cases have proved fatal in fifteen and seventeen hours, and one even in nearly twenty-four hours. There are, also, many cases that prove fatal in less than seven hours; some in six, some in five, in four, and one even in three, which appears to be the shortest authenticated one on record.

In relation to the quantity required to prove fatal, there is great diversity. It varies much with circumstances. The smallest quantity that has proved fatal in an adult is four and a half grains. On the other hand, some enormous quantities have been taken, and yet a recovery been had. In one case, no less than eight ounces of solid opium were taken, and yet the person recovered. Comparatively small doses of opium operate fatally upon some, owing to a peculiarity of constitution. The power of habit possesses a very considerable influence in delaying its action upon the system accustomed to it.

The morbid appearances caused by opium are, in general, neither constant nor well marked. In a case that might be called an extreme one, all the sinuses and vessels of the brain were gorged with fluid blood, and a quantity of serosity was found in the ventricles and base of the skull. The pharynx was red; the lungs distended and gorged with fluid blood; the cavities of the heart contained the same fluid blood; the villous coat of the stomach and intestines exhibited some degree of redness. This is an extreme case; but the appearance the most generally met with is, turgescence in the vessels of the brain, and watery effusion into the ventricles and on the surface of the brain. Neither of these, however, are by any means universal. Extravasation of blood is a possible, although a very rare effect of opium; and, perhaps, never occurs unless the poison happen to develope a disposition to apoplexy. In the bodies of those who have been poisoned with opium, lividity of skin is always more or less present, and sometimes it is excessive. Occasionally, a portion of the poison may be found in the stomach; but this is very rare. If taken in tincture, or any liquid form, it will be likely to be absorbed, or if not wholly so, it may be so in part, and partly decomposed by the process of digestion, and this whether it be taken in a liquid or solid form.

Treatment. Here the first and greatest object is to endeavor to remove the poison from the stomach. This may be accomplished in one of three ways. 1. By emetics. 2. By the stomach-pump. 3. By injection of emetics into the veins. Sulphate of zinc is the emetic recommended. The dose to be repeated after a short interval, in case the first fails to operate. In using the stomach-pump, care must be taken not to injure the stomach by too forcible suction. The injection of tartar-emetic, or a solution of antimony, into the rectum has succeeded in exciting vomiting. So, also, as a last resort, an emetic has been injected into the veins, and tartar-emetic has been generally found to answer the best for such a purpose.

During the whole of the treatment every effort should be made to keep the patient roused. This should be done by causing him to walk rapidly between two assistants; by blows on the hands and feet with a wet towel; and by dashing cold water in the face and on the head.

Artificial respiration has sometimes been resorted to with success. The principle of resorting to this is, that the ultimate cause of death from opium is the suspension of respiration; and that if it could for some time be maintained artificially, the poison in the blood would be at length decomposed, and consciousness gradually restored. So also galvanism has been resorted to in extreme cases.

Several substances have been proposed as antidotes to opium. On a rigid examination by Orfila, no one was found entitled to rank as such except a decoction of galls, and this but imperfectly. The conclusion he arrived at was, that this might with propriety be used as an imperfect antidote until the poison can be evacuated from the stomach.

THE HYDROCYANIC OR PRUSSIC ACID.

There are several considerations that tend to gather around this substance a great amount of interest. Among these are included the sources from which it is obtained, the minuteness of the quantity required for a fatal operation, and the amazing celerity with which it extinguishes life. In regard to the two latter, it is probably unequalled by any other poison. It comes, therefore, strongly recommended to the suicide and murderer, and is liable to be taken by accident.

This acid may be found under the form of a pure acid, or in a state of dilution with water. When exhibited under the first form, it is limpid and colorless; has an acrid, pungent taste, and a peculiar odor, which resembles that of the bitter almond. It is in the state of dilution, and as kept in the apothecaries' shops, that it is commonly used as a poison. This has nearly the same appearance, smell, and taste, as the strong acid. It is volatile, and looses its activity by exposure. *Guy*, 671.

The diluted acid found in the shops is possessed of different degrees of strength. Even the same preparation can be made to vary very considerably from any other, by means of evaporation and decomposition.

The sources from which it is obtained are principally the bitter almond, the cherry laurel, the peach blossom, the cluster cherry, and the mountain ash. *Christison on Poisons*, 689.

The tests, by means of which its presence may be detected, are, 1. Its peculiar odor. Under favorable circumstances, its smell is perceptible when no chemical agent is delicate enough to detect it. In the celebrated case of Sir Theodosius Boughton this was the only test resorted to. To be much relied upon, it should be identified by more than one person :

2. The sulphate of copper added to the acid rendered slightly alkaline by potash, throws down a greenish precipitate, which, on adding hydrochloric acid, becomes nearly white :

3. A salt of the protoxide of iron, such as common green vitriol, is added to the fluid first rendered alkaline by caustic potash, when a greenish brown precipitate is thrown down, which, on the addition of dilute muriatic or sulphuric acid, becomes of a deep prussian blue color.

The nitrate of silver is also a fourth test.

To detect it in a mixed fluid, Orfila recommends that the fluid be treated with animal charcoal without heat. A slip of bibulous paper, moistened with pure potash, is then to be immersed in the suspected fluid for a few minutes, and then touched with a solution of sulphate of iron, upon which the usual blue color will be produced on the paper. *Christison on Poisons*, 693.

This substance is poisonous in all its chemical combinations; affects all animals indiscriminately, from the highest to the very lowest in the scale of creation; and destroys all nearly in the same manner. Its most energetic action is through the serous membranes; its next most energetic is upon the stomach. It also acts on the cellular tissue. With all its energy and power of producing effects, it exerts no action when it is applied to the trunks or cut extremities of nerves, or to a fissure made in the brain or spinal marrow. The previous division of the nerves prevents not its action, but when the vessels of any part are tied before the application of the poison, its action is prevented. Both its odor and chemical analysis often detect it in the blood after death, and hence it is supposed to act through the medium of the blood vessels.

This acid acts on the brain, and on the spine also. This is clearly made out by its producing both coma and tetanus. To prove its independent action on the spine, the following experiment was made: The spinal cord in a dog was divided at the top of the loins, so that no movement took place when the hind legs were pricked. Hydrocyanic acid being then introduced into a wound in the left hind leg, symptoms of poisoning commenced in one minute, and the hind legs were affected with convulsions as well as the fore legs. *Christison on Poisons*, 698.

It is no easy thing to arrive at the smallest fatal dose of hydrocyanic acid. It will vary much with circumstances, such as the strength of the individual, and the fulness or emptiness of the stomach at the time. As nearly as can be ascertained, a trifle less than a grain of the pure acid is sufficient to destroy the life of an adult. *Christison*, 706–7; *Guy*, 677.

The time at which the symptoms first begin to show themselves, is an enquiry of considerable importance. This, of course, will depend much upon the quantity taken. In a case reported by Hufeland, a man swallowed about forty grains of the pure acid, and he was observed immediately to stagger a few steps, and then to sink down without a groan, apparently lifeless.

In the case of a physician who, by way of experiment, swallowed a dose which was evidently but little short of a fatal one, there was time to leave the shop and return, and to utter some expressions of fear, before the fatal symptoms commenced.

From experiments made by Magendie and others on animals, it would seem that if any considerable quantity be administered, the death is almost immediate. A single drop put into the throat of a dog, caused two or three deep, hurried respirations, and instantly he dropped down dead. When dropped under the eyelid, it caused death almost as instantaneously; and when injected into the jugular vein, he dropped down dead at the very instant, as if struck with a cannon-ball, or with lightning. *Christison on Poisons*, 694.

It has in one or two cases, become an important medico-legal question, what amount of voluntary effort can be made, in the interval occurring between the taking of the poison and the full commencement of its operation, so as to suspend consciousness. This question arose in the following case:

An apothecary's maid servant, who was pregnant by Freeman, her master's apprentice, the defendant, was found dead in bed, poisoned by the hydrocyanic acid. The body was found lying at full length on the bed, with the head turned a little on one side, the arms crossed over the trunk, and the bed-clothes pulled smoothly up to the chin. Under the clothes, on the right side, lay a phial corked, wrapped in paper, and containing three and an half drachms of the poison. The leather and string which had fastened the cork, were found in the chamber vessel. It seemed probable that four and a half drachms had been swallowed; and the question was, whether this was a case of suicide or homicide; whether the girl could, after swallowing this quantity of the poison, have corked the bottle, wrapped it up, and adjusted the bed-clothes. Several experiments were made on animals, with a view to settle this question. Several medical witnesses were sworn, all of whom, with one exception, testified that the supposed acts of volition, although within the bounds of possibility, were in the highest degree improbable. *Christison*, 704–5.

The only reliable means of settling the question properly, is, to collect cases where acts of volition have been performed after the taking of the poison. Of these, there are a few instances. An apothecary's assistant in Germany, took four ounces of the hydrocyanic acid of the Bavarian-pharmacopeia, which contains about four per cent of the acid. He was found dead in his bed, with an empty two-ounce phial on each side of the bed. The mattress, used in Germany as a covering, was pulled up as high as the breast, the right arm extended beneath it, and the left arm bent at the elbow.

In another case, an apothecary's apprentice left the shop to descend into the cellar for some carbonate of potash. He had been gone but a few minutes, when he was heard to cry, in a voice of alarm, "Hartshorn! Hartshorn!" On instantly rushing down stairs, he was found reclining on the lower step, and grasping the rail, and had scarcely time to mutter "Prussic acid," when he expired, not more than five minutes after leaving the shop. He had taken a drachm of the Bavarian acid; had endeavored to get at the ammonia, but had not sufficient strength to uncover the bottle.

In a third case, a man was found dead on the seat of a water-closet, and had the bottle from which the poison was taken, corked in his pocket. *Guy*, 678–9.

These cases certainly go to show that some degree of voluntary effort can be made after taking a fatal dose of the prussic acid, and hence to justify the verdict of acquittal which was rendered in the case before mentioned.

The symptoms developed in both man and animals, vary with the quantity taken. In the case of an individual, who was experimenting to determine the effect of small doses on himself, and who took from twenty to eighty-six drops of the diluted acid, he says he was attacked for a few minutes with nausea, salivation, hurried pulse, weight and pain in the head, succeeded by a feeling of anxiety, which lasted about six hours.

Given medicinally, it frequently produces salivation with ulceration of the mouth. If given in doses too small to prove fatal to animals, it soon produces giddiness, weakness, and salivation; then tetanic convulsions, and gradually increasing insensibility. After some time, the insensibility goes off rapidly, and is succeeded by a few attacks of convulsions, and transient giddiness, the whole duration sometimes not exceeding half an hour, but sometimes a whole day, or even longer. Any considerable increase of the dose, causes the animal to die either convulsed or comatose. *Guy*, 675.

In illustration of the effect of a large dose on man, the following case may be taken: A man apprehended for theft, swallowed an ounce of alcoholized acid, containing about forty grains of the pure acid. He immediately staggered a few steps, and then sank down without a groan, apparently lifeless. His pulse was gone, and the breathing, for some time, imperceptible. After a short interval, he made so forcible an expiration, that the ribs seemed drawn almost to the spine. The legs and arms then became cold; the eyes prominent, glistening, and quite insensible; and after one or two more convulsive expirations, he died five minutes after swallowing the poison. *Christison on Poisons*, 701.

The hydrocyanic acid does not belong to the class of cumulative poisons. In regard to the duration of the poisoning, it is probable that very large doses occasion death in a few seconds, and at all events in a few minutes. In one case, death occurred from taking a large dose of alcoholic solution of the acid, in two minutes. In two cases, already alluded to, death occurred in five minutes. It is said, that if the individual survive forty minutes, he will generally recover. It has however been found the fact, that in several cases, life has continued for forty-five minutes, and yet death been the result. The action is the most immediate, and the life the soonest extinguished, when the acid is inhaled into the lungs in the form of vapor. Of several animals breathing air saturated with its vapor, a bird died in one second; a rabbit in one, a cat in two, one dog in five, and another in ten seconds. Dangerous accidents have ensued from its vapor having been incautiously snuffed up the nostrils. *Christison on Poisons*, 695 – 707.

In regard to the post-mortem appearances, the first thing to be noticed is, that the eyes retain a peculiar glistening and staring appearance long after death, resembling, somewhat, their appearance in life. It is not, however, uniformly observed. Besides, it is not peculiar, death from carbonic acid having the same effect. The countenance is pale and composed; the spine and neck stiff; the belly drawn in; the back livid. The blood has been generally found extremely fluid, and altered in its nature, having a glimmering bluish appearance, as if it had been mixed with Prussian blue. The substance of the brain is natural, but its vessels were gorged with blood, and effusion of serum into the ventricles. The lungs are turgid. There is generally a turgescence of the venous system, and an emptiness of the arterial, throughout the whole body. The villous coat of the stomach has been found red; the intestines reddish; and the liver gorged with blood. From the body generally, the blood, and more especially the cavities, exhaled the odor of the hydrocyanic acid. This has been relied upon strongly as a test, but it will not be found to be constant. If the patient long survive after taking the poison, it will exhale so freely from the lungs as to have nearly or quite all escaped. There have been instances where it has been recognized in the stomach, and not in the other parts of the body; and, also, in other parts of the body, and not in the stomach. The exposure of the body for some time after death to a shower, or to a current of air, or even in a large airy room, will generally be sufficient to cause the odor to exhale. The presence of the odor in the blood is more satisfactory than in the stomach, intestines or brain. *Christison*, 709–10; *Guy*, 677.

In regard to treatment, it is unnecessary to say much. No specific antidote has ever been discovered. Unless the relief comes speedily, it will be useless. The course commonly resorted to is to employ powerful and diffusible stimulants. Of these, ammonia is considered the best. It may be applied immediately to the nostrils; so, also, it has been injected into the jugular vein of a horse with good results. Another remedy is chlorine. Cold affusion has been applied to the spine of the back, with great success So, also, frictions of the chest and stimulating liniments. On the whole, Dr. Christison concludes that the proper treatment consists in the use of the cold affusion, and the inhalation of diluted ammonia or chlorine. *Christison*, 715; *Guy*, 679.

The *bitter almond*, as also its essential oil, are both poisonous, owing to hydrocyanic acid contained in them. The symptoms, post-mortem appearances, and treatment, are all substantially the same as those of the hydrocyanic acid.

The essential oil and the water distilled from the leaves of the *cherry laurel* are poisonous from the prussic acid contained in them. The celebrated case of Sir Theodosius Boughton was from supposed poisoning with the cherry laurel water.

So, also, the *common peach*, the *cluster-cherry*, and the *mountain ash*, derive poisonous properties from the hydrocyanic acid they contain.

NARCOTIC GASES. The principal of these are the carbonic acid, sulphuretted hydrogen, and carburetted hydrogen. These only produce their characteristic effects when received into the lungs in a diluted state, as their effect, when pure, is to asphyxiate, by creating such a violent spasm of the glottis as to exclude the atmospheric air from the lungs.

The *carbonic acid gas* is derived from the combustion of fuel, the calcining of chalk or limestone, the fermenting of vegetables, animal respiration, from plants during the night, and it is frequently found in mines, caverns, pits and wells.

When this gas is diluted with atmospheric air and respired, it produces a sensation of weight in the head, principally in the fore and back part of it; of tightness in the temples, giddiness, ringing in the ears, imperfect vision, drowsiness, loss of power, hurried respiration, nausea and vomiting. These are followed by complete insensibility, slow pulse, and stertorous breathing, foaming at the mouth, pale and livid skin, occasionally convulsions and tetanic spasms, at other times a deep sleep, which gradually terminates in death. *Guy*, 684.

The post-mortem appearances are not constant. The body is generally swollen, and marked with livid spots; the countenance pale and composed, but sometimes livid and bloated; the limbs frequently rigid; the tongue sometimes protruded; the eyes bright and prominent; cadaverous rigidity is slow in appearing, and putrefaction is retarded. The large veins and right cavities of the heart are filled with black blood; the lungs congested; the vessels of the brain distended; both its membranes and substance injected; serum in the ventricles, and at the base of the brain; and sometimes effusion of blood on the surface, and into the ventricles. *Guy's Principles of Forensic Medicine*, 684-5.

The treatment consists in restoring pure air to the lungs; in using cold affusion; applying ammonia and stimulant embrocations to the chest; and, in extreme cases, resorting to artificial respiration, galvanism, and the inhalation of oxygen gas.

The *sulphuretted hydrogen* is the most deleterious of all the gases. It is an extremely active poison, and may cause death by being injected into a blood vessel, by its introduction into any cavity of the body, and even, when applied to the skin, it exerts a powerful influence.

When breathed in a moderately diluted state, it produces giddiness, a sense of tightness across the temples, oppression at the pit of the stomach, nausea, weakness, loss of sense and motion, occasionally tetanus, delirium, convulsions, cold skin, an irregular and frequent pulse, and laborious respiration. *Guy's Prin. of Foren. Med.*, 693.

The post-mortem appearances are, fluidity and blackness of the blood; dark tint of all the internal vascular organs; destruction of the contractility of the muscles; redness of the bronchial tubes; engorgement of the lungs; all the viscera exhaling an odor resembling that of decayed fish, and a strong tendency to early putrefaction. *Christison on Poisons*, 739.

The treatment consists in restoration to pure air, the use of stimulants and of chlorine gas. *Guy*, 693.

The *carburetted hydrogen*, the chief constituent of the coal gas produces vomiting, convulsions, tetanic spasms, stertorous respiration, and injection of the countenance, foam at the mouth, and dilated pupil.

The morbid appearances are, pallor of the integuments and internal tissues, generally; florid discoloration of the neck and back; light florid color of the muscles; absence of indications of venous congestion; fluidity of the blood; infiltration of the lungs; injection of the small intestines; rapid rigidity. *Guy's Prin. of Foren. Med.*, 694.

CLASS III. NARCOTICO-ACRIDS.

The poisons included under this class possess a double action, one local and irritating, the other remote, and acting on the nervous system. They are all derived from the vegetable kingdom. They generally prove fatal by operating on the nervous system, although some produce very violent local symptoms, but seldom sufficiently severe to occasion death. When they produce narcotism it is generally of a comatose nature, and often attended with delirium.

It is seldom indeed that any one of these produces its irritant and narcotic effects at the same time. In small doses they are often irritants, the dose not being large enough to act narcotically. In large doses they are narcotics, and while that is their mode of action, the body is generally insensible to the local irritation. The narcotic symptoms, and those of irritation, more commonly exist successively, preceding or succeeding each other, and very rarely both exist simultaneously. *Christison on Poisons*, 758.

Most or all of them act remotely by entering the blood vessels. Some produce obvious effects where they are applied, like monkshood which produces numbness and tingling of the part with which it is placed in contact. They act remotely on the brain and spine and sometimes the heart.

The symptoms the most common to the entire class are dryness of the throat, vomiting and purging, giddiness, delirium, convulsions, palsy and stupor. Delirium may be termed a characteristic symptom, and is commonly of the violent kind, and frequently attended with incoherence.

Few traces of them are left in the dead body. There may be inflammation in the stomach and intestines, when the irritating effects have been developed, and fullness or congestion in the brain, as a trace of the narcotic action. But neither of these are constant, well marked, or decisive.

The poisons in this class are very numerous. The great majority of them are possessed of little interest to the mere medical jurist. They have been divided by Orfila into six groups, of which the

1. Includes those whose principal symptom is delirium, such as atropa, datura, stramonium, &c.:
2. Those whose principal symptom is tetanus, as nux vomica, strychnine, &c.:
3. Those which excite convulsions, and cause impaired sensibility and sleep, as coculus indicus, camphor, upas antiar:
4. Poisonous mushrooms:
5. Poisonous grain:
6. Alcohol, ether and empyreumatic oils.

A brief reference to some of these is all we can do.

Atropa Belladonna—deadly night shade, is poisonous in its root, leaves, and berries. The poisonous property is due to an alkaloid, called atropia. It is not an active poison, and does not produce its symptoms until after the lapse of one or two hours.

They are dryness of the throat, dilated pupil, and delirium succeeded by coma. In addition to these, slight convulsions, tetanic spasms, loss of sight and speechlessness, are sometimes to be met with.

The treatment consists in removing the poison from the stomach as promptly as possible, and afterwards using stimulants. *Guy's Principles of Forensic Medicine*, 696.

Datura Stramonium—thorn apple. This plant prevails very extensively in the United States, and several cases of poisoning with it have occurred. The fruits and seeds are both poisonous. The symptoms are dryness of the throat, giddiness, dilated pupils, flushed face, glancing of the eyes, incoherence, a state resembling that of intoxication. A wild, happy, talking delirium generally prevails. Sometimes paralysis of the limbs, convulsions and cold sweats are present. Vomiting should be procured or promoted as soon as possible. Dissection has disclosed the blood fluid, the brain considerably congested, the stomach, intestines, and other organs natural. *Guy*, 696–7.

Nicotiana Tabacum—tobacco. This has proved destructive to life when used as a clyster. The symptoms are nausea, giddiness, vomiting, purging, great faintness, weak and irregular pulse. It acts on the circulation, as well as on the nervous system.

Conium Maculatum—hemlock, produces as symptoms, vertigo, dimness of sight, delirium, stupor, pain in the abdomen, vomiting, diarrhœa. There are but few traces left of the action of the poison.

Aconitum Napellus—monkshood, is every part poisonous, but that in most common use is the extract of the leaves. It is a very active poison, producing as its symptoms, a burning heat in the mouth, throat, gullet and stomach. There is a sensation of swelling in the face, and of tingling over the whole body. Along with this are restlessness, dimness of sight, and stupor, followed by vomiting, purging, swelling and tenderness of the stomach, cramps, convulsive twitchings, delirium and tetanic spasms.

The traces left in the body are of severe inflammation in the gullet, stomach and intestines. *Guy*, 697–8.

Colchicum is also poisonous in all its parts, causing acute pain, followed by retching, vomiting, and tenesmus, feeble pulse, great anxiety, and after some time, incessant vomiting of coffee-colored matter, suppression of urine, excessive debility, feeble respiration, and, shortly before death, profuse, dark, watery purging.

Digitalis—fox-glove is frequently used in medicine, and is important as being one of the cumulative poisons. It acts both on the brain and alimentary canal. When given in large doses, it produces nausea, headache, giddiness, dryness of the mouth and throat, slight salivation, great debility, vomiting, purging and colic pains, a small, frequent and irregular pulse, followed by dimness of vision, a feeling of distension in the eyeballs, convulsions, delirium and coma. *Guy's Principles of Forensic Medicine*, 698.

When small medicinal doses are repeated a sufficient number of times, their accumulated results are nearly the same with those above stated.

The second group of narcotico-acrids, according to Orfila's arrangement, includes but five poisonous substances; but those act in a very peculiar manner. They act violently on the nervous system, and also possess local irritant properties. A small dose will produce a fatal effect. Their action is exerted through the medium of the blood vessels, but it is expended principally upon the spinal cord. They produce violent spasms, like tetanus, and cause death during a fit, probably by suspending respiration. Their action more resembles that of the hydrocyanic acid, than any other poison, but they do not in the least impair the sensibility of the nervous system. *Christison*, 796.

Their energy resides in peculiar alkaloids. They seldom leave any considerable traces in the dead body. There may be slight venous congestion, and sometimes signs of inflammation in the alimentary canal. To this group belong the tribe of

Strychnia, which is endowed with a greater amount of destructive energy than any other poison except the hydrocyanic acid. A wild boar was killed with a third of a grain, in ten minutes, injected in the form of alcoholic solution into the chest. It acts powerfully in whatever way it is introduced into the system; but more energetically, when injected into a vein. The first symptoms are agitation and trembling. These run into a general spasm, in which the head is bent back, the spine stiffened, the limbs extended and rigid, and the respiration for some time interrupted by the fixing of the chest. A calm then succeeds, the senses remaining entire and acute. Another paroxysm then sets in, which may be succeeded by another, and another still, until death occurs through suffocation.

This poison is to be found in the

Nux vomica, which is exhibited in the form of a light-brown kernel, of a flattened round shape, with radiating fibres externally, and with a fine downy covering. The nux vomica is frequently found in the stomachs of those poisoned with it. In order to detect it, the contents of the stomach must be boiled in water acidulated with sulphuric acid. The liquid, after filtration, is neutralized with carbonate of lime, and then evaporated to dryness. The dry mass is then acted on by successive portions of alcohol, and evaporated to the consistence of a thin syrup. The product has an intensely bitter taste, precipitates with ammonia, becomes deep orange-red with nitric acid, and will sometimes deposit crystals of strychnia on standing two or three days. *Ib.*, 799.

It has an intensely bitter taste, but notwithstanding that, has occasionally been used as an instrument of murder. It has also been used for self-destruction, although it gives rise to an excessive degree of torture. Its symptoms are the same as those of strychnia, already enumerated. So severe are the spasms, that the whole body is stiffened and straightened; the legs pushed out and forced wide apart; no pulse or breathing perceptible; the face and hands livid, and the muscles of the face violently convulsed.

This poison seems to act on the spinal marrow alone. The cause of death appears to be prolonged spasm of the thoracic muscles of respiration.

In small doses, insufficient to cause death, there is pain and heat in the stomach, burning in the gullet, a sense of rending and weariness in the limbs; succeeded by stiffness in the joints, convulsive tremors, tottering, and at length violent and frequent fits of tetanus. *Ib.*, 801.

The smallest fatal dose of the alcoholic extract yet recorded, is three grains. A fatal case is mentioned as caused by two fifteen grain doses of the powder.

In relation to morbid appearances, they differ according to the period at which death has occurred. Where it takes place speedily, they are insignificant; where it is longer delayed, there are usually appearances of inflammation in the stomach and intestines. In one case, there was serous effusion on the surface of the cerebellum, accompanied with a softening of the whole cortical substance of the brain, but especially of the cerebellum. So powerful are the spasms, that the body sometimes retains, for some time after death, the attitude and expression fixed on it by their terrible action during life. This may continue for some hours, so long that the body passes into that state of rigidity which precedes decay, without having gone through the preliminary stage of flaccidity immediately after death. *Christison on Poisons*, 803.

Little can be said in relation to treatment. The stomach should, as soon as possible, be evacuated, which should be attempted by emetics or the stomach-pump. Iodine, bromine, and chlorine, are stated to be antidotes for poisoning with the alkaloid of nux vomica, forming with it a compound which is not deleterious. Unless, however, they are on hand to be promptly administered, a very little delay would prove inevitably fatal. *Christison*, 804.

Camphor, in a large dose, occasions giddiness, confusion, loss of memory, and incoherence, attended with heat of skin, and hurried pulse, followed by profuse sweating a feeling, of intoxication, and furious delirium. These are succeeded by sleep and exhaustion. It has never produced fatal effects. *Guy*, 699.

There are several other substances that are included under the class of narcotico-acrid poisons, but which are not of sufficient importance in a medico-legal point of view to justify a separate consideration. There is, however, one that may form an exception, viz:

Alcohol. This has been generally believed to act on the brain through the medium of the nerves. There is little doubt, however, but that it enters the blood. It is a violent poison when injected into the cellular tissue, and produces in such case, the same general symptoms as when taken into the stomach.

The effect of a small dose is to produce excitement. When so large as to justify the designation of poisonous, the symptoms are violent excitement, flushed face, giddiness, confusion of thought, delirium, and various mental affections, varying with the character. They are followed by a strong tendency to doze. *Christison*, 843. w

When it causes death, it usually does so, by the coma becoming deeper and deeper, or by its developing an apoplectic state, or by the occurrence of some accident.

When the alcohol is swallowed in very large quantities, the coma comes on in a very few minutes, and soon becomes deep and profound, as in apoplexy. The face is livid or ghastly pale; the breathing stertorous; the pupils either much contracted, or, more commonly, dilated and insensible. It is said a recovery may take place if the iris of the eye remain contractile; but if, on the approach of light, it continues dilated and motionless, a recovery is extremely improbable. *Christison*, 848.

The kind of action thus far described is narcotic. Sometimes after its narcotic symptoms have passed away, another set appear, which indicate inflammation of the alimentary canal. These cases, however, are very rare.

In regard to morbid appearances, the villous coat of the stomach, in animals poisoned by it, exhibits generally a cherry-red color. In man, this is not always exhibited. Sometimes the appearance is natural, and sometimes there is injection of the small intestines. Dark fluid blood is often found in the heart and large vessels. Sometimes there is congestion of the brain, and in rare cases, extravasation of blood in the brain. There has also been found a very extensive softening of the mucous coat of the stomach.

The same general principles in regard to treatment that were mentioned in the case of poisoning with opium, should also be resorted to in that by alcohol. The two great objects to be kept in view are, to remove the poison from the stomach, either by emetics or the stomach-pump, and to keep the patient roused as much as possible. To accomplish the latter, water may be injected into the ears and cold affusion applied to the head. Ammonia and its acetate, have been sometimes found useful as internal stimulants.

The subject of compound poisoning, or the result produced when two poisons of varying or opposite properties are administered in poisonous doses, is both curious and interesting. Very few facts, however, have been as yet collected, and not much, therefore, is known in reference to it. The general results are one of two things: either the poisons modify the action of one another, or one of them overpowers and prevents the action of the other.

Thus, in a case of poisoning with arsenic and alcohol, where, under the excitement of a debauch, a large quantity of arsenic was taken seven hours after a meal, and although it remained in the stomach one hour, before its contents could be extracted by the stomach-pump, yet no symptom of poisoning with arsenic followed. The reason probably was, that the narcotism induced by the alcohol, impeded or prevented the action of the arsenic. *Christison on Poisons*, 860–61.

In another case of the same kind of poisoning, the quantity of arsenic taken was very large, so that it proved fatal; but no constitutional symptom of poisoning with it, except vomiting, appeared under eighteen hours, and life terminated in forty-one. The stomach presented signs of violent irritation.

Where alcohol and laudanum were taken, the usual effects of opium were very greatly retarded, no great degree of stupor occurring under five hours. After that, the narcotic symptoms appeared, which continued until death.

Where laudanum and corrosive sublimate were taken, no violent symptoms of the latter occurred at first; afterwards, frequent purging and tenesmus, with bloody stools, but no pain or tenderness of belly, nor vomiting. A violent salivation commenced on the fourth day, and under this, and dysenteric affection, he became exhausted, and ultimately died. There the action of the narcotic agent veiled, or retarded that of the irritant poison.

Dr. Christison, page 864, is of the opinion that it is probable the modifying influence is established in one of two ways: either by one poison producing a state of venous plethora or distension, which impedes, or for a time prevents, the absorption of the other; or by one poison producing an insensibility of the membrane with which the other is in contact; so that not only the local injury actually done has not the usual remote effect on the constitution, or on distant organs, but likewise is at times substantially less extensive than in ordinary circumstances.

IV. PERSONS FOUND DEAD.

The fourth and last division of the second class embraces the extensive and important subject of persons found dead. This will best be considered under the following heads of enquiry:

1. What is death? In what does it consist?
2. Is the death real or apparent? and what are the signs and indications of real death, and the value of each?
3. What are the duties of the coroner and the medical witness in the case of a person found dead?
4. What are the principal causes of sudden death? How do they operate, and what traces do they leave in the organization?
5. What are the circumstances under which the body is found? Its position, place, relations, &c., with a view to discriminate by what agency it became divested of life.
6. What are the causes, appearances, signs and indications of death by DROWNING, and the medico-legal questions connected with it?
7. The same of death by HANGING.
8. The same of death by STRANGULATION.
9. The same of death by SMOTHERING.
10. The same of death from COLD.
11. The same of death from BURNING.
12. The same of death from LIGHTNING.
13. The same of death from STARVATION.

1. What is death? In what does it consist? Death is the negation of life, as darkness is of light. Life has been defined to consist in the "sum of the functions by which death is resisted." It is, therefore, as defined by Brown and Rush, "a forced state;" a state in which the energy of its functions is constantly exerted to resist the tendency to decay and dissolution. It is obvious, that during life the organism is reared up and sustained under the action of forces that are sufficiently strong to resist the aggressions of the chemical affinities, and the operation of the laws that act upon dead matter. When, however, for any cause these forces cease, the organism is handed over to the action of those affinities, and the operation of those laws. Without designing to embark in physiological speculation, I will lay down a few plain propositions relative to life, with a view of attempting to throw some light on the phenomena of death.

To the highest form of life, three orders of functions are made to contribute. These are the muscular, nervous and sensorial. The first appropriates to itself the contractile power, developed through the action of the voluntary and some of the involuntary muscles. The muscles of locomotion are an instance of the former, the heart is one of the latter.

The nervous function expresses that peculiar nervous influence which is instrumental in exciting the muscle to contract, the gland to secrete, the organs of assimilation to carry on their processes; which is the active agent in the generation of animal heat, and in all those operations which contribute to the nutrition and growth of the system. The organs from which this influence is derived are the brain and the spinal marrow; the nerves being its agents or instruments of transmission. Of this influence there are two orders: the one which contributes to those processes in the system which are entirely involuntary; the other, to those changes and operations which are voluntary. The first is derived from the entire cerebrum, cerebellum, and medulla spinalis, including all the ganglions and plexuses; the other, from those parts of the great nervous centre, from which the nerve proceeds that conveys the sensation, or is the agent by which the volition becomes outwardly manifested.

The sensorial function is identified as that which feels and wills. It is through this that the highly organized system is enabled to sustain relations with objects and things around it. It is this that appropriates that order of nervous influence that pervades the voluntary organs.

During life, these three functions exist together, and act in harmony. The sensorial is, in general, the most drawn upon, and hence requires alternations of rest. Hence the state of sleep is rendered necessary, in order that the powers of the sensorium may become refreshed and invigorated.

Of these three functions, the sensorial is the last that commences its action in the organism, and usually and naturally the first that ceases to act. The muscular and nervous functions are active in the fœtal state, before the sensorial manifests any existence. So, also, the sensorial is the earliest to cease. Indeed, it is the cessation of the sensorial function that constitutes death.

A fact somewhat singular in relation to these functions is, that the muscular and nervous are independent of the sensorial, and even continue to act, for a longer or shorter period of time, according to circumstances, after its cessation, or after death has actually taken place. The animal heat is kept up for some time afterwards, the solvent power of the gastric juice continues, the circulation of the blood in the capillaries goes on for one or two hours after death; and this furnishes one, and perhaps the principal reason, why no blood is found in the arteries on dissection.

If these two functions are independent of the sensorial, and continue after death, it may reasonably be asked through what agency they are at last quieted and finally cease.

This enquiry brings to view an important fact, which furnishes the principal reason why I have laid down the foregoing propositions. *Respiration is a voluntary act*, and belongs, therefore, to that class of phenomena which are purely voluntary. The muscles through whose agency it is performed are voluntary muscles. At times, when respiration is difficult or obstructed, a greater number of them are brought into operation than at other times. The want of fresh air in the lungs after an expiration, creates a necessity for the action of the sensorial function; this function being always exercised in all voluntary operations. Through its means a sufficiency of nervous influence is furnished to stimulate the muscles of respiration to act, and their action produces an inspiration. The want is thus satisfied, and the sensorial function may rest until another inspiration is required. It may be asked how respiration can continue during sleep, when the sensorial power seems to be quiescent. We answer, that the function can be exercised without consciousness, as is actually seen in the movement of limbs, or change of position, during sleep, when affected by an unpleasant sensation, without one being in the least degree conscious of it. The suspension of respiration prevents the oxygenation of the blood, and leads necessarily to the cessation of the heart's action. Thus the nervous and muscular functions both cease in consequence of the suspension of respiration. M. Lallemand has published the history of a fœtus, in which the brain and spinal marrow were equally deficient, notwithstanding which, it even exceeded the usual size, the heart was perfect, and it was evident that the circulation had been properly performed. No sooner, however, was it born, than it perished; because there was no sensorial function, and perhaps not sufficient nervous influence to cause and continue respiration. 2 *Paris and Fonblanque's Med. Juris.*, 20.

Respiration, in this view of it, forms a connecting link between the sensorial and the nervous and muscular functions. To the first it sustains the relations of an effect, to the other two, those of an exciting cause. The answer, therefore, to the question involving the first topic is—that death is the suspension or removal of the sensorial function, and that it leads to the suspension of the others through the cessation of respiration.

2. Is the death real or apparent? And what are the signs and indications of real death, and the value of each?

It may appear strange to many that there should ever be any real difficulty in discriminating between the dead and the living, or any chance of mistaking the one for the other. Although the accounts of premature interments are probably most, or at least many of them, without foundation; and although the length of time during which bodies are ordinarily kept here and in England before interment, is generally sufficient to afford all reasonable assurance that accidents of this kind will not take place, yet there are undoubtedly, states or conditions of the system, in which the certainty of knowledge is attended with difficulty. Take, for instance, the following account given by Dr. Cheney of the voluntary attempt to simulate death by Col. Townsend. He informed the doctor and two or three others, that he would give an account of an odd sensation he had for some time observed and felt in himself, which was, that composing himself, he could die or expire when he pleased, and yet, by an effort, or somehow, he could come to life again; which it seems he had sometimes previously tried. We all three, says the doctor, felt his pulse first. It was distinct though small and thready, and his heart had its usual beating. He composed himself on his back, and lay in a still posture some time; while I held his right hand, Dr. Baynard held his hand on his heart, and Mr. Skrine held a clean looking glass to his mouth. I found his pulse sink gradually, till at last I could not feel any by the most exact and nice touch. Dr. Baynard could not feel the least motion in his heart, nor Mr. Skrine discern the least soil of breath on the bright mirror he held to his mouth. Then each of us by turns examined his arm, heart and breath, but could not, by the nicest scrutiny, discover the least symptom of life in him. This continued about half an hour. As we were going away, (thinking him dead,) we observed some motion about the body, and upon examination, found his pulse and the motion of his heart gradually returning; he began to breathe gently and speak softly. This experiment was made in the morning and he died in the evening. On opening the body nothing was found but disease of the kidney, all the other viscera being perfectly sound. *Guy*, 374–5.

This is a case of voluntary syncope. There is also another condition of the system commonly called *trance*, which in many respects resembles death. A very remarkable instance of this occurred in the case of the Rev. William Tenant, of New Jersey. Intense application to study brought him into a decline, and after lingering for many months he fainted and apparently died. In this state he remained perfectly motionless and senseless, and to all appearance dead, for the space of three days, and, but for the attachment of a young physician, who accidentally discovered some warmth still lingering about the body, would undoubtedly have been buried. He recovered slowly; all his former ideas were for some time blotted from his mind; and it was a year before he was perfectly restored. He ever after maintained that he actually died, or that his soul left the body, and went to heaven, where he heard and saw unutterable things, and was about to join the celestial chorus, when one of the heavenly messengers said to him, "you must return to the earth." At that instant, he said, he groaned and opened his eyes, and for three years after, the sounds which he had heard were not out of his ears. *Guy's Principles of Forensic Medicine*, 375.

Another instance of a very extraordinary character is quoted as having been related by Dr. Crichton, formerly physician to the Emperor Nicholas, while grand duke. A young girl had, for some time, kept her bed with a nervous affection, and at length, to all appearance, was deprived of life. Her face assumed all the characteristics of death; her body was perfectly cold, and every other symptom or indication of death was present. She was removed from her bed chamber, and placed in a coffin. On the day fixed for her funeral, hymns, according to the custom of the country, were sung before the door; but at the moment the coffin was about to be nailed, a perspiration was perceived upon her skin, and, shortly afterwards, was succeeded by a convulsive motion in the hands and feet. In a few moments she altered her eyes, and uttered a piercing scream. In a few days, her health was reëstablished. The account she gave of her situation, was exceedingly curious. She said, she appeared to dream she was dead, but that she was sensible to every thing that was passing around her, and distinctly heard her friends bewailing her death; she felt them envelope her in her shroud, and place her in the coffin. This sensation gave her extreme agony, and she attempted to speak, but that her soul was unable to act upon her body. She described her sensations as very contradictory, as if she was, and was not, in the body at the same instant. She in vain attempted to move her arms, to open her eyes, or to speak. The agony of her mind was at its height when she heard the funeral hymn, and found they were about to nail down the coffin. The horror of being buried alive gave a new impulse to the mind, which, in consequence, resumed its power over the corporeal organization, and produced the effects which excited the notice of those who were about to convey her to a premature grave. *Forsyth's Med. Juris.*, 155.

The principal signs of death relied upon, are,

1. *Cessation of the circulation.* This is usually determined by applying the finger to the wrist, or the hand to the heart. There may be motions of the heart which these means cannot detect, and the cases related show that the heart's motion has apparently ceased, and that for a long time, and yet life has not been extinct. This is not, therefore, an infallible criterion.

2. *Cessation of the respiration.* There are several means by which this is determined. Among these are the following. Ascertain whether a feather can be moved, or a looking glass soiled, or whether any motion is communicated to a cup of water placed on the chest or abdomen. These seem fully as effectual as those resorted to for the purpose of determining the cessation of the circulation; and yet the respiration, or the power of respiring, remains, although these proclaim the contrary. This is not, therefore, a certain sign of death. *Guy*, 377.

3. *The facies Hippocratica.* This is thus described. "A wrinkled and dry brow; hollow eyes; pointed nose, bordered with a black discoloration; a depressed, hollow, and wrinkled state of the temples; elevation of the ears; the lips relaxed and pendant; the cheek bones sunk; the chin wrinkled and pointed; the skin dry and livid or lead colored; a dull white powder on the hair of the nostrils and eye brows." To this there are several objections:

1. Where it exists, it does not long survive the extinction of life:

2. It is by no means universally met with, being generally wanting in cases of sudden death:

3. It is rather an indication of the act of dying than of actual death :

4. It has been observed where recovery has taken place :

5. It is often observed in living persons. It may be produced by a strong passion, as fear.

This, therefore, is not a reliable sign.

4. *State of the eye.* Two appearances have been relied upon. The one consists in a loss of transparency of the cornea, a collapsed and wrinkled state of that membrane, together with the formation of a tough glairy mucous, almost of the consistence of membrane, covering the conjunctiva. The other is a collapsed and softened state of the eye, which is generally attributed to the absorption of the aqueous humor. The first are not reliable as they may occur during life. The second is not always present in case of death, as where it has occurred from apoplexy, carbonic acid, hydrocyanic acid, &c.

5. *State of the skin.* The indications here are *pallor*, *livid discolorations*, and *loss of elasticity.* The last is a sign of value. The two first may occur during life.

6. *Insensibility and immobility.* These may be present during life, and are not, therefore, of any value.

7. *Extinction of muscular irritability.* Suppose the fact clearly settled that muscular irritability is totally extinct, life may be assumed to be so too. If a muscle will not contract upon being pricked with a pin, or on application of the galvanic or electric fluid, the person is undoubtedly dead. The muscles of the trunk and extremities retain their irritability longer than the involuntary muscles, with the exception of the right auricle of the heart.

8. *Extinction of animal heat..* The higher temperature of the body is closely connected with the circulation of the blood. The cessation of the latter is attended with a declension of the former. Hence the extremities often grow cold before death, the circulation in them becoming languid, or ceasing. All parts of the body do not become cold before the extinction of life. There may be a great diminution of heat over the entire surface of the body, in cases where the circulation is very languid, or has

apparently ceased, or where the powers of the nervous system are greatly depressed. This may occur in syncope, asphyxia, and trance. Great care must, therefore, be taken, or an appeal to this sign will mislead, as a great diminution of animal heat may take place, and yet be consistent with life.

The extinction of animal heat, at the termination of life, is a gradual process, depending much upon the mode or manner in which death takes place. The period usually varies from two or three hours, to fifteen or twenty. It is influenced—

1. By the temperature and moisture of the surrounding air; the motion of the atmosphere; the exposed state of the body itself:

2. The condition of the body, in regard to corpulency or emaciation, occurring more slowly in the former than in the latter:

3. The age. The bodies of the aged cool much faster than those of the young and vigorous :

4. The mode of death. In cases of chronic disease or hæmorrhage, the body cools much quicker than in all forms of sudden death. In the former, much of the heat may be parted with during life.

9. *Rigidity.* This sets in whenever muscular irritability ceases, which is generally a very few hours after death. It is confined to the muscular system, and may be regarded as the first certain evidence of death. It has no dependence on the nervous system, for it does not commence until the nerves have ceased to be excited by the galvanic fluid. It takes place in all positions of the body, and is sometimes so strong that the body may be lifted up by the head and feet. It is regarded by John Hunter as the last act of the vital principle; and by Nysten, as a concentration of the remaining vital powers in the muscles, preparatory to the total disappearance of the vital principle. *Guy,* 381.

This rigidity commences with the muscles of the trunk and neck ; next it seizes upon those of the upper extremities ; and lastly, those of the lower. Its disappearance is nearly in the same order. Its degree and duration are directly as the muscular developement. The later it occurs, the longer it lasts; and the reverse. It takes place the more speedily in the bodies of the aged, and of those who have died of diseases accompanied with great debility; while in those who have died from acute inflammation of the stomach, or by irritant poisons, it is strongly developed, and lasts for a considerable time. In case of death from spasmodic cholera, it commences soon after the extinction of the vital principle, and may continue four or five days. Warmth retards, and cold accelerates, the period of time at which rigidity commences.

This cadaveric rigidity is so peculiar, that it is not easily confounded with any state of the living body. It is true, there may be a rigidity of the muscular system in cases of syncope, asphyxia, apoplexy, catalepsy, and tetanus; but in such cases, the contraction extends through the whole body, and animal heat is also present. A surer method of distinguishing, is to bend the extremity forcibly, and if the rigidity proceeds from a vital contraction, the limb will be restored to its original position, but not in case of cadaveric rigidity. This, therefore, may be regarded as a certain sign of death.

10. *Putrefaction.* This also is a certain sign of death. It causes a softening, and bluish, greenish, or brownish discoloration of the structures, and is characterized by a peculiar odor. It is liable to be confounded with no appearance of the living body except gangrene; but is distinguished from that by its odor, and by having no precise limits, while the spots of gangrene are limited, and the most generally are found on the extremities.

From the cessation of cadaveric rigidity, the system seems to be surrendered up to the laws that act upon dead animal matter. The skin becomes inelastic, the flesh less firm, and the blood, obeying the laws of gravity, falls to the most depending parts of the body. Hence the pallor of some parts, and the cadaverous lividity of others. The fluids contained in the gall bladder and in the humors of the eye, exude, tinging the parts contiguous to the former with bile, and in the latter case, giving the dull and collapsed appearance to the cornea. Hence the relaxed and softened appearance of the tissues, attributed by many to the commencement of the putrefactive process.

This is followed by the development of gases in several of the cavities of the body, especially in the abdomen. This development gives rise to several changes, altering the condition of the body in relation to buoyancy; thrusting the diaphragm upwards; forcing the blood in the larger vessels towards the head and neck; causing the face to swell, the eyes to become prominent, and the mouth and nostrils to discharge a mucous or bloody fluid.

After a time, the cuticle becomes detached, the muscles grow viscid and pulpy, acquiring a dark greenish color, and exhaling a highly offensive odor. Finally, all the tissues become changed into a soft semi-fluid mass, that gradually loses its moisture, dries up, and forms a fibrous fatty residue, which gradually disappears. The process of putrefaction, once commenced, under favorable circumstances, progresses with rapidity; the decomposed parts acting upon others, and promoting their decomposition also. The most important conditions, essential to the commencement and rapid progress of putrefaction, are the following:

1. *Temperature.* Putrefaction is much more rapid in the summer than in the winter; finds the most favorable temperature in that varying between 70° and 100°, and is arrested by one as high as 212°, as it evaporates the fluids, and as low as 32°, as it congeals them.

2. *Moisture.* This is entirely an essential condition. Those parts of the body which naturally contain the most moisture, as the brain and eye, commence putrifying the soonest, and progress the fastest. It is from the same cause, that bruises and the edges of wounds, are subject to a rapid putrefaction; and so, also, are bodies that have remained for some time in the water, and are then exposed to the air. A dry air may arrest putrefaction. In the deserts of Arabia, the bodies of travellers have been preserved for years, from the want of access to moisture. So, also, a rapid current of air has about the same effect as dry air, suspending putrefaction by causing rapid evaporation.

3. *Air.* Some suppose this essential to putrefaction. Others deny that it is a necessary element. The process is retarded in case of subjection to the influence of hydrogen, carbonic acid, and nitrous acid, instead of atmospheric air. Oxygen promotes putrefaction; but, combined with nitrogen, its activity is increas-

ed. Heat, moisture, and air, are the three great agents that promote the putrefactive process.

4. *Age.* Of the bodies of children, adults, and aged persons, the first putrify the soonest, and the last sooner than those of adults.

5. *Sex.* The bodies of females putrify more rapidly than those of males, their cellular membrane being loaded with a greater quantity of adipose matter.

6. *Condition of the body and cause of death.* So far as the condition is concerned, that state or condition of the body is the most favorable to the most rapid putrefaction, in which there is the greatest quantity of fluid. In death from asphyxia, it is more rapid than in death from hæmorrhage. So, also, it is more rapid in those dying from acute, than from chronic diseases. Where mechanical injuries have been inflicted, the process first commences, and progresses the most rapidly, in the parts that have been injured.

7. *Period of interment.* The longer a body has been exposed to the action of the atmosphere previous to its interment, the more rapid will be the putrifying process afterwards.

8. *Place and mode of interment* Putrefaction is slower in dry elevated situations, and more rapid in loose swampy grounds. This is owing principally to the absence in the one, and the presence in the other, of a greater degree of moisture. In sand or gravel, the process is slow; in marl or clay, more rapid. It is slower, the deeper the body is buried.

The rapidity of the progress of putrefaction became a subject of medico-legal enquiry in the case of Desha, who was indicted and tried in Kentucky, for the murder of Baker, in 1824. 2 *Beck*, 32–3, &c. They were last seen together on the second November, Tuesday, 1824. The body of Baker was found *six days after*, (Monday); his throat cut, and five wounds inflicted on the side of his head, the skin being broken. It was in a hollow, the woods and undergrowth thick around it, and but little if any exposed to the sun. The weather was unusually warm for the season, the nights being cool. The body was at first a little stiff, but afterwards became limber. It had no smell of putrefaction. No alteration on Tuesday, a trifle on Wednesday; on Thursday it turned black, and became somewhat offensive. The wounds appeared fresh, and bled much; body not swollen when found, but became so on Wednesday or Thursday. Several medical witnesses were examined. One thought that the body of a man might be ten days without putrifying, if there was a discharge of much blood, as there seemed to have been here. He supposed that the contents of the stomach, within that time, would produce putrefaction, unless there had been spirits drank, as it appeared in this case there had. The result was that Desha was convicted, and went to Texas.

Adipocire is so called from its possessing the physical characters of a compound of wax and fat. It has a yellowish-white color, and is formed in bodies which remain a long time in water, as also in those buried in moist soils. It is formed by the fat of the body becoming converted into the margaric and oleic acids; which, uniting with the ammonia generated during decomposition, form a sort of animal soap.

3. What are the duties of the coroner, and the medical witness, in the case of a person found dead?

The coroner was an ancient officer at the common law. He is even mentioned as early as the year 925. His duties, as also the proceedings in his court, have been very much matters of statute regulation, although the statutory enactments have been sometimes merely affirming the common law.

In this State, his duties are prescribed by statute. (2 *R. S.*, 827-8, third edition.) Whenever he receives notice that any person has been slain, or has suddenly died, or been dangerously wounded, he is to repair to the place where such person shall be, and forthwith summon not less than sixteen, nor more than twenty-three persons, qualified by law to serve as jurors, and not exempt from such service, who must appear before the coroner at such place as he may appoint, to make inquisition concerning such death or wounding.

As soon as twelve or more shall appear, they must be sworn by the coroner, to enquire how, and in what manner, and when and where, such person came to his death or was wounded, and who such person was, and into all the circumstances attending such death or wounding. They are to make a true inquisition, according to the testimony offered to them, or arising from the inspection of the body.

The coroner is empowered to issue subpœnas for witnesses, and it is also enjoined upon him as a duty, to cause some surgeon or physician to be subpœnaed to appear as a witness upon the taking of such inquest.

The coroner must reduce to writing the testimony of all the witnesses examined before his jury; which, together with the inquisition of the jury, and all recognizances and examinations taken by him, must be returned to the next criminal court of record to be held in the county.

The jury, after hearing the testimony and inspecting the body of the person found dead or wounded, must deliver to the coroner their inquisition in writing, signed by them; in which they shall find and certify, how, and in what manner, and when and where, the person so dead or wounded, came to his death, or was wounded, and who such person was; and all the circumstances attending such death or wounding; and who were guilty thereof, either as principal or accessory, and in what manner.

In case murder, manslaughter, or assault has been committed, the coroner must bind over the witnesses to appear and testify at the next criminal court, and he may also issue process to apprehend the party charged with the offence.

The inquisition found by the jury, and returned by the coroner, is not final or conclusive upon any party. The great object is to ascertain the cause and manner of death, the name of the deceased, and the party, if any, who has been guilty of the crime. It is the only court where the mere fact of sudden death unaccounted for, or severe wounding, gives jurisdiction to act. In any other court, a charge must first be made against the party supposed guilty, and then the same enquiries may be gone into relative to the cause of death, and the instrumentalities by which it has been effected, as are made in the court of the coroner.

The coroner's inquest need not be held upon the spot where the body is found; but the jury, before they can render their inquisition, must first view the body.

In England, provision is made for remunerating the medical witness for his time and attendance before the coroner's court, and also for any post-mortem examination he may make of the body of the deceased. In the United States, no compensation is allowed the medical witness for any services of this description. But although he is bound to appear and testify, in obedience to subpœna, and that without any compensation, yet he is not bound, in addition to that, to make a post-mortem examination, or analyze the contents of the stomach. Although he might be required to inspect the body while on the witness' stand, yet he could not be compelled to leave the stand for that purpose; or, in general terms, to make any efforts to gain any particular information for the purpose of testifying. *Guy*, 370–71.

Should the medical witness incline to make an examination of the body, he should make a thorough one; noting first, in case the deceased was unknown, all those peculiar circumstances, such as age, sex, stature, and peculiar marks that may serve the purpose of identification. So, also, the presence or absence of animal heat, of cadaveric rigidity, and putrefaction, may indicate the length of time the body has been divested of life.

The suggestions heretofore made in reference to examinations in cases of death by poisoning and wounds, will supercede any extended discussion relative to anything of the like character here. It will be important to examine every cavity of the body, even when the cause of death is very apparent; because, otherwise, it may be urged that disease may have been present in the cavities unexamined, which may have produced the fatal result. *Guy's Principles of Forensic Medicine*, 369.

4. What are the principal causes of sudden death? How do they operate, and what traces do they leave in the organization?

Sudden death generally arises from a powerful invasion of the living forces as they are developing themselves in the action of the *heart*, the *brain*, or the *lungs*.

A cessation of the heart's action is called *syncope*. An invasion of the action of the brain, *apoplexy;* and of that of the lungs, *asphyxia*—although a term certainly not well chosen.

The first, syncope, may arise from several causes; as,

1. From organic lesions in the structure of the heart itself, or in that of its vessels.

2. From destroying, or essentially impairing, the action of the brain; to the extent that the nervous influence would cease to be furnished. This may arise from inflicting such a degree of violence upon that organ as to annihilate its power of action; or, some sudden passion or emotion may so shock the general nervous system, as at once to destroy that nervous influence which is necessary to secure the heart's action.

3. From the operation of certain poisons.

4. From asphyxia, destroying the action of the heart by annihilating the functions of the lungs.

In death from the first cause, hæmorrhage would be likely to occur, and the phenomena exhibited would be, pallor of the face and lips, cold sweats, dizziness, dimness of vision, dilated pupils, gasping and sighing respiration, a slow, weak and irregular pulse, and sometimes nausea and vomiting, restlessness and tossing of the limbs, transient delirium, and convulsions. Dissection will not only reveal the organic lesions, but will also disclose the fact, that the heart and its great vessels are either empty, or contain in their cavities a very insufficient quantity of blood. The heart here ceases to act, because both cavities receive a quantity of blood too small to excite them to contraction.

In death from the second cause assigned, if violence be done to the brain, or the power of innervation is made to cease from any inorganic lesion of that organ, it will, in general, be rendered evident upon post-mortem dissection. In such case, the heart, instead of being found empty of blood, is much distended, and the blood in the left auricle and ventricle is generally of a florid color, resembling arterial more than venous blood. Several well attested instances have occurred, in which the action of the heart has suddenly ceased from the influence of some violent passion. In such cases, there has probably been some organic affection of the heart, or its vessels. Thus Philip V. died suddenly, on being informed that the Spaniards had been defeated. On opening the body, the heart was found ruptured. The celebrated John Hunter expired suddenly, from mental emotion, but the valves of the heart had long been diseased. It has been asserted, that sudden joy was more likely to terminate life than grief. The effect of the former is rather to accelerate, of the latter to retard, circulation. 2 *Paris & Fonblanque's Medical Jurisprudence*, 28 – 9.

In death from the fourth cause, the right side of the heart is found distended with blood, while the left is comparatively empty.

The apoplectic mode of death, or that which occurs through an invasion of the brain, is neither rare nor uncommon. It may produce death directly or indirectly. In the first, it acts immediately upon the heart. The innervation ceasing, the circulation is immediately arrested ; each side of the heart contains its due proportion of blood, and all the cavities are distended from the sudden loss of power in the heart to propel its contents. In the second, it acts upon the lungs, paralyzes the respiratory muscles, and thus produces death by what is termed asphyxia, which will come presently to be noticed.

It may happen that apoplexy may terminate life suddenly, and in situations where no one was present at the time. In such cases, what shall be the criterion, or method, of distinguishing death from that cause, from any other sudden death ? Attention may here be paid—

1. To a certain apoplectic make, or peculiar conformation of the body : this consists, principally, in a large head, short neck, and plethoric frame :
2. To the peculiar posture in which the person may be found :
3. To the food that he has recently eaten :
4. To any ligatures that may be found surrounding any part :
5. To the appearances revealed by dissection, particularly in the head.

The *simple apoplexy* of Dr. Abercrombie, often proving fatal in twenty-four hours, and leaving no traces in the dead body, may create much difficulty in discriminating.

Sudden death commencing at the lungs, and embracing all the forms of asphyxia, is the most essential to investigate in connexion with persons found dead. Asphyxia, strictly, means pulselessness; but it is understood to embrace those cases in which there occurs a cessation of the heart's action through the interruption of the respiration. This may be produced in a variety of ways. The muscles of respiration may cease their action; the lungs may cease to act; or atmospheric air may be excluded from them. The first may arise from several causes. The muscles may become inert from cold or debility. A stroke of lightning, division of the spinal marrow, or pneumogastric and phrenic nerves, will destroy the nervous influence, so necessary to produce innervation. Mechanical restraint will have the same effect, and so also will tonic spasm, as occurs in death from tetanus or hydrophobia. The lungs may also cease their action in consequence of a division of the eighth pair of nerves, or of their being mechanically compressed by air gaining admission into the pleura. All the numerous ways by which atmospheric air is excluded from the lungs, are also so many distinct methods of producing asphyxia.

The symptoms which accompany asphyxia, will vary considerably according as the cause producing it acts with celerity or slowness. In case of entire exclusion of atmospheric air, the symptoms are strongly marked, and succeed each other with great rapidity. The first struggle is for breath, and a strong effort is made to expand the chest. The effort brings the blood into the head, causing the face at first to flush, and very soon to grow turgid and livid. The veins of the head and neck swell, and the eye-balls are starting from their sockets.

The distress passes away, and is even followed by sensations of an agreeable kind, by giddiness, a great variety of brilliant colors appearing before the eyes. Next comes loss of consciousness, convulsive movements, and relaxation of the sphincters. The whole course of symptoms is run between two and three minutes.

If the cause acts slowly, the symptoms are somewhat modified, and the intervals between them longer. The partial admission of air serves to protract the struggle, the efforts being followed by a sense of heaviness, and pain in the head. This is succeeded by dimness of sight, torpor of intellect and sensation, vertigo, and loss of voluntary motion. The lungs and heart still keep up a very feeble and languid action, until, at length, that also ceases. The greater protraction of the struggle brings the blood more generally into the capillary system; the face becomes injected, and exhibits a deep violet discoloration, extending to the hands and feet. When the capillary circulation ceases, the state of asphyxia is complete. *Guy*, 394–5.

The appearances in the dead body are the following: On the face, and other parts of the body, are violet discolorations. These spots differ from cadaverous lividity, in the fact, that they may be found on any part of the body, and are not confined to the depending parts. Their seat is chiefly in the mucous membrane of the skin. The eyes are prominent, firm, and brilliant. The occurrence of cadaveric rigidity is early, well marked, and continues for a long time. In cases of violent struggle, the venous system of the brain may be found full of blood; its substance presenting bloody points. At times, serum may be found effused into the ventricles, and blood at the base, or in the substance of the brain. The lungs are much distended with a thick dark-colored blood. So also the liver, spleen, and kidneys are gorged. The right cavities of the heart are much distended and gorged with thick, black, and liquid blood. The left cavities are empty, or contain but a small quantity of blood.

Various theories have been proposed, to account for asphyxia. The active cause of death has formerly been sought, and supposed to have been found, in the change produced in the blood by depriving it of its process of oxygenation in the lungs. Recent experiments have tended to disprove this; and the cause is now generally supposed to consist in the accumulation of blood in the lungs, and a consequent diminished supply to the left cavities of the heart; the quantity of blood thus constantly diminishing, until the circulation entirely ceases. Hence the emptiness of the left cavities of the heart.

5. What are the circumstances under which the body is found?

Its position, place, relations, &c., with the view to discriminate by what agency it became divested of life.

1. *Its Position.* Not unfrequently, a murderer, having dispatched his victim, endeavors so to dispose of the body, as to create the conviction that the deceased had died by his own hand.

It most usually happens in such cases, that the criminal has omitted something either in the arrangement of the body, or of the surrounding objects, by means of which the fraud has been detected. The question is, whether the position corresponds with the cause of death. Suppose a man killed by a blow on the head were found in an upright position, the just inference would be that the body had been placed in that position after death.

2. *The place* where the body is found. One fact to be determined here is, whether the death occurred on the spot, or elsewhere ; the body having been brought to the spot where found, after it was divested of life. It must, accordingly, be ascertained, if possible, what amount of hæmorrhage has taken place ; whether there is any stone or other hard substance which, by a fall upon it, would have caused a severe contusion ; whether there is any nail, or other instrument, that may have produced a lacerated wound ; and whether any foot-prints are to be found in the vicinity of the body ; or any evidence of a struggle is there to be found.

3. *Its relations with surrounding objects.* One point to observe is, the proximity of the instrument of death. Not only its distance must be ascertained, but also its peculiarity of position, as compared with that of the body. A case in which these relations became of great importance to investigate was that of the Prince de Condè, who was found suspended by the neck in his bedroom, and the question was, whether it was a case of suicide or of murder : the body having been suspended after death to create the belief that the death was suicidal. On the legs, and one of the shoulders, were found abrasions, which corresponded closely with the position of surrounding objects ; the former with a heavy chair placed near the body, and the latter with a projecting part of the window to which he was found suspended. Thus, it was rendered pretty evident that these bruises arose

from the struggles after suspension, and that the case was, therefore, one of suicide.

4. *The clothes on the body should be examined.* The principal things to be had in view on such examination are, the stains that may be found on them, and the rents and cuts that may be discovered. The direction of the two last mentioned must be carefully noted; as, also, whether the size, shape and direction coincide in the several garments, and correspond with wounds found on the body itself.

6. What are the causes, appearances, signs and indications of death by DROWNING, and the medico-legal questions connected with it?

1. What are the causes of death by drowning? Of these there are several. That which is probably the most common is what may be termed *asphyxia by suffocation.* This mode of death is accomplished by the exclusion of atmospheric air from the lungs. It occurs when a man, in the full possession of his faculties, falls into the water. As he rises to the surface after sinking, attempts are made at respiration, in which the most generally some air, along with water, is received. The water taken in by an act of deglutition passes into the stomach. Unless he can swim, he again sinks; and, on again rising to the surface, repeats the same attempts. All self-control is very soon lost. There occur, irregular movements of the arms and legs, the hands grasping at all objects within reach. The water, coming in contact with the larynx, causes coughing, which may result in ejecting the fluid with a portion of the air which was contained within the lungs. The intensity of the struggle determines the blood to the head, and as it ceases to be oxygenated, its venous qualities act on the brain. The lungs, at length, become unable to perform their functions; the elastic re-action of the parieties of the chest force out of them the remaining air, which arises in the form of bubbles to the surface; a feeling of delirium supervenes; a ringing sensation in the ears is experienced; all consciousness is lost; and death occurs from asphyxia. This is, by far, the most common mode of death; and the quantity of water that finds its way into the stomach and lungs will depend very much upon the

strength of the individual, and the length of time to which his struggles have been protracted. *Guy*, 405-6; *Taylor*, 401; 2 *Beck*, 148.

Another form of death has been termed *nervous* or *syncopal asphyxia.* This occurs when sudden fright, an impression of cold, an attack of hysteria or catalepsy, seizes upon the person, annihilating all consciousness at the moment of immersion. Here, there is no effort, no struggle, the death being, in fact, owing to syncope.

Another, or third form, has been styled *asphyxia from cerebral congestion.* This occurs where the impression of cold, or some other cause, developes apoplexy in those of an apoplectic habit.

One or two other forms have been mentioned, but they are of little practical importance. Indeed, the mode first mentioned is far more important than all the others put together.

2. What are the appearances presented in death by drowning? These will, of course, depend upon the mode of death. Where it occurs from the first mode, the face will be found generally pale, although, sometimes of a violet hue; a frothy foam at the mouth, and the tongue often between the teeth. A froth, sometimes tinged with blood, is often found in the larynx, trachea, and bronchi. Water may be found in the trachea, and sometimes even in the minute ramifications of the bronchia. The lungs have a violet hue, and contain a quantity of black fluid blood. As, in other modes of asphyxia, the right cavities of the heart and the venæ cavæ contain a considerable quantity of blood; while the left cavities and the aorta are nearly empty. The stomach contains a portion, sometimes considerable, of the fluid in which the body is immersed. The liver and spleen are gorged with blood. The medullary substance of the brain presents, when sliced, a number of bloody points. Sand and mud are sometimes found in the hollow of the nails. *Guy's Prin. of Foren. Med.*, 406-7.

In the syncopal mode of death, the face and skin generally are pale, owing to a spasm of the cutaneous vessels. The trachea is empty; or, if it contain a small quantity of water, it will not contain froth. The lungs are only slightly developed, and have their natural color. The brain and other organs are in a natural state. There is no water in the stomach ; and the right and left cavities of the heart contain about equal quantities of blood, but those quantities are small.

In the apoplectic mode, which is extremely rare, the usual indications of death by apoplexy will be found in the brain.

3. The signs and indications of death by drowning ; and under this may be included the consideration of the first medico-legal question, viz : *What are the signs and indications, if any, which distinguish death by submersion from death previous to it ?* Or, in other words, *What are the means of discriminating death from drowning from death arising from any other cause ?*

It may be well to pass in brief review some of the appearances that characterize death by drowning, to see how far they may be relied upon as distinctive.

1. *Pallor of the face, with the violet hue occasionally found.* Neither of these are peculiar to this kind of death. The color varies with the length of time the body remains immersed in water. If it be soon removed, the surface is pale ; but, if suffered to remain some days, it becomes livid and bloated. This may, therefore, be a means of furnishing some evidence in regard to the length of time the body has lain in the water.

2. *The position of the tongue, and the injected state of its base.* The tip of the tongue is sometimes found in contact with the incisor teeth, and sometimes between the closed jaws. The jaws are generally found firmly closed, and the tongue is often wounded. The injected state of the base of the tongue is found in several other kinds of death, as that by hanging, strangulation, &c., and cannot, therefore, be relied upon as indicating death from drowning. *Guy*, 408.

3. *The existence of a froth, sometimes bloody, found in the larynx, trachea, and bronchi.* This froth is generally found of a white color, consisting of a number of very small bubbles, all having a watery envelope easily broken. It is, undoubtedly, the result of vital action, and is formed only in those cases where the drowning man has risen to the surface, and inspired small quantities of air which has been received along with water. It is

more easily formed in the last bronchial ramifications than in the trachea; and the part where it is preserved for the longest period, is at the bifurcation of the trachea. 2 *Beck*, 156–7. The objections to it as distinctive are two,—the one that it may be found in other forms of death; as, in death from hanging, apoplexy, and epilepsy; the other, that it is by no means invariably found in those who have been drowned. Thus, it may not be found in the following cases:—where no air was inhaled while in the act of drowning; where the body remained long in the water after death; where it is exposed to the air several days before it is examined; or even where it is removed from the water with the head depending.

4. *The existence of water in the trachea, or in the minute ramifications of the bronchia.* In regard to this, considerable diversity of opinion has formerly existed, but there is now less doubt. Not only water, but sand and mud have entered the air passages.

Dr. Coxe claims to have proved by experiment: 1. That when an animal is immersed in any fluid, and taken out previous to the last efforts at respiration, none of the fluid will have entered the lungs; and 2. That when water is found in the lungs of an animal, it is absolutely necessary that the animal be under water when making its last efforts to breathe. 2 *Beck*, 158. It is, therefore, influenced by the depth of water, and the access to air, and is not universally found in those who have died from drowning.

There appears to be no doubt now but that water may find its way into the lungs of bodies thrown into it after death. The quantity will depend very much on the position of the body. If upright, a larger quantity will gain access; if horizontal, a less quantity; and if the head be entirely depending, probably none would enter at all, or if any had entered, it would flow out.

5. *The fullness of the right cavities of the heart, and the emptiness of the left.* This is common to all the forms of asphyxia, by whatever means it may be produced, and is not, therefore, peculiar to drowning.

6. *The existence of water in the stomach.* When water is found in the stomach of the recently drowned, it is presumed to have got there by deglutition, and hence the proof of life at the time is

clear and complete. It may, however, have been received prior to drowning; and in order to afford clear evidence that the death was caused by drowning, it should be identified with the water in which the body is found. This may be difficult unless the water be of a peculiar character, or some fragments of plants floating on it be swallowed.

It has been claimed by some, that where a dead body is thrown into water, the fluid may gain access to the stomach; and that thus the fact of the presence of water in the stomach, proving death by drowning, is done away with. It may be stated as generally true, that the parieties of the œsophagus close so firmly after death, that no water can gain access to the stomach. There may be two possible exceptions; the one where the body is at so great a depth in the water that the columnar pressure will be sufficient to overcome the resistance, and the other, where putrefaction has produced a general relaxation of the tissues, and thus removed the obstacle offered in their more unyielding state. In the latter case, the appearances about the body might be sufficient to indicate that its entrance was from that cause. In general it may be stated, that the presence of water in the stomach, identical with that in which the body was found, is regarded as affording very satisfactory evidence of death from drowning.

7. *The fluid state of the blood.* This was formerly much insisted on as a test, but it is obvious it can be of little real value, as it cannot be relied upon when putrefaction exists, and when it does not, it is by no means a certain sign, as it may be the consequence of other forms of death.

8. *The state of the brain.* An injected state of this organ occurs in many other forms of death. It is not always present in death by drowning. It clearly would not be in the syncopal form of death.

9. *The existence of bloody urine in the bladder.* This is not only of rare occurrence, but may also be found in death by hanging, and in some cases of poisoning, and is not, therefore, distinctive.

10. *Excoriations of the fingers, and the presence of sand or dirt under the nails.* This has been supposed to indicate the last effort of the living individual to save himself from death. It would

not occur where the water was so deep that the bottom was not reached, nor where the form of death was syncopal, nor where the individual was in a state of intoxication. It is not really regarded as possessing much value.

11. *Froth in the mouth and nostrils.* This, like froth in the air passages, is often wanting; but where it is found, is regarded as an indication possessed of considerable value. It may depend upon the putrefactive process; the air generated, forcing the froth in the larynx and trachea into the fauces.

In summing up the value of all these signs and indications of death by drowning, it will be apparent, that but few can be relied upon as possessing sufficient force to entitle them to be received as evidence; that those the most reliable are froth in the trachea and bronchia, froth in the mouth and nostrils, and water in the stomach; and that the effect to be given to this species of evidence, is derived rather from the concurrence of a number of them, than from the force of any one singly.

2. Another medico-legal question may be, *at what period does death take place from drowning?* This question, so far as it relates to the time at which individuals who have fallen into the water die, must obviously be extremely indefinite. Some have more strength and more presence of mind than others, and can, therefore, keep themselves more at the surface, and hold out much longer. The more definite question is, how long can a person remain beneath the surface of water without becoming drowned? The answer to this is, that when the mouth is so covered that air cannot enter, asphyxia supervenes in the course of one or two minutes at the farthest. This applies with little variation to all individuals, and can be little, if at all, varied by habit. It has been observed of sponge divers, who are accustomed to the practice of diving, that no one could sustain entire submersion of the body for two consecutive minutes.

In ordinary cases of drowning, the individual has more or less access to air, and hence the time intervening between his falling into the water, and expiring, is considerably various. There have been some singular cases of resuscitation, where the immersion has been for much longer periods of time than those already mentioned. One well authenticated case is mentioned, where the individual was resuscitated after an entire submersion of five consecutive minutes. *Taylor*, 404. So also another is recorded after an immersion for the same time. Another is mentioned, of a boy recovered after a submersion of from five to ten minutes. Another case is mentioned of recovery after six minutes immersion. Another very extraordinary case has been cited, where an individual is stated to have been resuscitated after fourteen minutes submersion. This seems to be the longest authentic period known, although there are cases of alleged recovery, after half, and even three-quarters of an hour's submersion. *Taylor*, 404. Much probably is to be set down to the credit of inaccuracy of observation, although it is readily conceivable, that in cases of purely nervous or syncopal asphyxia, there may be a recovery from submersion after a much longer period than where the asphyxia occurs from suffocation. These facts should admonish us not to give over too readily the use of the appropriate means to resuscitate, although the submersion may have been for a considerable time.

3. A third medico-legal question relates to the *marks of violence that can be traced on the bodies of those found in the water.* Whether any such were inflicted before or after death; and whether they were designed or accidental; and whether self-inflicted or the act of another; are all questions elsewhere discussed. One of the principal points to be determined here is, whether the injuries are of such a nature as to account for death before submersion. Injuries may occur to the body, after it is divested of life, in consequence of its being borne by the violence of the stream against some obstacle. In this case it will present the appearance of wounds inflicted after death. The individual may have been murdered and then thrown into the water. In this case, the wounds will present the appearances of those inflicted during life, while no indications of death by drowning will be present. So also severe injuries may be sustained, and yet the individual, still alive, may be thrown, or throw himself, into the water. In this case, the indications of death by drowning will be present, but they may be much feebler than in those instances

where death by drowning occurs in a healthy, sound individual. The rapidity of the stream, the situation of its banks, the presence or absence of obstacles, may enable the medical jurist to judge whether the injuries perceived are due to any of those causes. The height fallen from, and the obstacles in the way, should be carefully observed.

4. The fourth question regards the *effects of immersion on the dead body, and the changes produced by it.* The specific gravity of the body is a little greater than that of water, hence it will sink in it whether living or dead. So slight, however, is the difference, that the body may float when its cavities have been previously filled with air. It has even been suggested that where death has occurred from strangling, the cord still remaining about the neck, there may be sufficient air confined within the body to make it float in water. Ordinarily, at the termination of life, the body sinks, and remains sunken some four or five days, when the gases developed by putrefaction render it specifically lighter than water, and it rises to the surface and there floats ; the bodies of males generally with the back upward, those of females with the abdomen. *Taylor*, 410.

It may sometimes become material to determine how long a body has lain in water. Inferences in relation to this are derived from the appearances which the parts present ; the progress of putrefaction ; and the fact whether that fatty compound, termed adipocere, has been produced. Water, whether stagnant or running, will produce this, but the latter the most readily. In stagnant water the formation of it is not complete under a period of two months. A month is about the earliest period at which it may be observed. A body interred in the soil requires a much longer time. *Taylor*, 410.

5. *Was the drowning the result of accident, suicide or homicide?* Little can be said that will throw any light on this subject. If there is no mark of violence found on the body, there can be no means of determining whether the drowning was the result of accident, suicide or homicide. If there are marks of violence found, then the question will arise whether they are of such a character as to lead to the conclusion that they were inflicted by

another, or self-inflicted previous to immersion, or accidentally inflicted by striking the body against an obstacle. The wound may be in some concealed part, or beyond the reach of the individual himself, and by that means be rendered clear that it was the act of another. The great majority of injuries are of such a character that they may be homicidal or suicidal. These questions have been investigated under the head of wounds.

7. What are the causes, appearances, signs and indications of death by HANGING, and the medico-legal questions connected with it?

1. *The cause of death from hanging.* This may depend somewhat upon circumstances. The cause which probably operates in the majority of cases, is the suspension of respiration by compression of the larynx. Dr. Monroe suspended a dog, having made an opening into his trachea below the place where the cord encircled his neck. The suspension continued three-quarters of an hour, and no apparent injury was sustained, respiration having been carried on through the aperture. When, however, the cord was placed below the aperture, and the animal was suspended, life became extinct very soon. *Kay on Asphyxia*, 290.

An attempt was once made to save a criminal upon this principle. An incision was made in the neck, and a tube introduced into the trachea to provide for a continuance of respiration. After being taken down, blood was drawn from the jugular vein, the malefactor once opened his eyes and sighed, but did not recover. He was a very heavy man, and probably some other cause of death operated, in his case, beside the suspension of respiration. One extraordinary case of suspension is related by Dr. Plott, of a woman in the reign of Henry VI., who remained suspended one whole night, and was still alive, owing as it was said, to her larynx having been ossified. A case is well authenticated of a woman convicted in Edinburgh in 1728, who after having the sentence of the law executed upon her, or attempted so to be, recovered, and afterwards lived twenty-five years. *Kay on Asphyxia*, 292.

Sometimes the cord may be so placed between the lower jaw and the larynx, as that there will not be a complete obliteration of the air passages. In such case the small supply of air enables the system to struggle on for a longer or shorter period, and life may be prolonged until congestion occurs in the brain.

This introduces to the second cause of death, viz., apoplexy, arising from pressure on the large blood vessels sufficient to produce an interruption of the circulation. The veins lying nearer the surface, and being more exposed than the arteries, are so pressed by the cord, that the return of the blood from the head is interrupted; and thus congestion produced in the vessels of the brain. Death resulting from this cause would be produced more slowly than from the suspension of respiration. Probably in most cases, both these causes are in operation, but the former would be the most efficient.

A third cause of death may be found in a laceration of the trachea or larynx, or a luxation or fracture of the cervical vertebræ, from a rupture of the ligaments of the neck. Death from this cause is the most speedily effected, and occurs without a struggle. It is accomplished by a careful adjustment of the cord, and by giving a twisting motion to the body at the moment it is cast into the air. The height of the fall, in connexion with the weight of the person, has something to do with this form of death.

A fourth cause is ascribed to the compression of the nerves of the neck. To ascertain the effect of this, Mr. Brodie passed a ligature under the trachea of a Guinea pig, and tied it tight on the back of the neck with a knot. The ligature was removed at the end of fifteen minutes, and the animal was found dead on the following morning. The lungs were out dark and turgid, presenting an appearance similar to that which is observed after the division of the eighth pair of nerves.

The last mentioned, is probably seldom or never the sole cause of death. It may operate to prevent resuscitation, provided the other causes have proved insufficient to produce death.

Death from hanging, from whatever immediate cause it may proceed, generally takes place speedily. Restoration to life has often been found impossible after a few minutes suspension. If the neck has suffered no serious injury, resuscitation may sometimes take place after a suspension of five minutes and even longer. In other cases, a much shorter period, without the occurrence of such injury, will extinguish the vital principle.

Some instances have occurred, especially in the French revolution of 1793, in which recoveries were had of several persons who attempted to commit suicide by hanging. It seems from the accounts given by such, of their sensations, that they were not always the same; owing probably to different degrees of pressure upon the larynx and blood vessels. One instance is given of a man and woman who survived hanging. The woman remembered nothing, but the man stated, that on the application of the cord, he felt no pain, but sank, as it were, into a profound sleep. In another case, the first sensation was flashes of light before the eyes, and then a sinking into the same sleep. *Guy*, 422–3.

From the results of all the experiences that can be gathered upon this subject, either from the suicide who has been seeking to destroy life, or the philosopher whose only object is to experiment, it would appear that sometimes there is an immediate loss of sense and motion; in others the sensations are pleasurable though short, being followed by an indistinctness of vision, and subsequently by the appearance of a bluish flame, or brilliant circles of colors before the eyes, and at the same time there is a singing or hissing sound in the ears. Then all consciousness is lost, and death sooner or later supervenes. These symptoms are obviously referable to a disturbance of circulation in the brain, and hence incline to the belief that very often death is due both to the suspension of respiration, and also the interruption of the circulation, giving rise to congestion in the vessels of the brain.

2. *What are the appearances, signs and indications of death by hanging?* These will depend much upon the cause of death. They have been principally collected from an examination of the bodies of executed criminals, in which more or less violence has been used, and the countenance is expressive of suffering. They are to be found—

1. *In the countenance*, which appears livid and swollen; the lips appearing distorted; the eyelids swollen and of a bluish color;

the eyes red and projecting, sometimes seeming to start from their orbits; the tongue enlarged, livid, compressed between the teeth, or frequently protruded; a froth appearing about the lips and nostrils:

2. *The neck exhibits the mark of the cord*, being a deep ecchymosed impression, the skin sometimes excoriated, the muscles and ligaments in the hyoideal region at times lacerated, as also the larynx and upper part of the trachea.

3. *There are not unfrequently ecchymosed patches, of different extent, about the upper part of the trunk, and on the extremities, with a discoloration of the hands:*

4. *The fingers are either contracted or firmly clenched:*

5. *The urine, fæces, and seminal fluid, are sometimes involuntarily expelled at the moment of death:*

6. *The body retains its animal heat longer than in other modes of death:*

7. *If the inspection is made soon after death, the right side of the heart and large veins are found distended with blood:*

8. *The substance of the brain presents increased vascularity, its vessels being usually congested, but rarely presenting bloody extravasation:*

9. *A mucous froth, sometimes bloody, is found in the trachea, and the mucous membrane of the stomach congested.*

The peculiarity and distinctive character of most of these signs and indications, will come up for consideration under the first medico-legal question, which is—

1. *Did the hanging occur during life or after death?* This question may arise when there exists the suspicion that the person found dead has been first murdered, and then suspended, with the view of deceiving as to the true cause of death.

1. *The state of the countenance.* Little can be collected from this, except from the degree of injection of the vessels of the head and face. This will be likely to be the most marked, the longer the system has struggled on under an imperfect suspension of respiration.

2. *The mark of the cord.* The impression produced by the cord was formerly supposed to be invariably ecchymosed, and

hence to indicate with great certainty that death occurred from suspension. The size and material of the cord varied the impression, a soft handkerchief leaving one far less marked than a hard rope or other like ligature. There is seldom injury done to the blood-vessels of the neck sufficient to cause real ecchymosis, or effusion of blood into the cellular tissue. The livid circle around the neck is the most commonly found in criminals who have been executed, as more violence is usually done in such cases than in those of suicide.

More recent examination in regard to this feature, has led to the very general conclusion, that it is not invariably present where death has occurred from hanging. In fifteen cases examined by M. Klein ; in twelve, examined by M. Esquirol ; and in twenty-five, of suicidal hanging, which occured to M. Devergie, there was no ecchymosis whatever. Dr. Remer collected one hundred and one cases, and of these no less than eighty-nine presented a well marked ecchymosis. Of six cases observed by Dr. Fleichman, there was no ecchymosis in two of them. In a case mentioned by *Taylor*, 419–20., of a young man who attempted to commit suicide in a state of intoxication, and was cut down after hanging about half an hour, no ecchymosed mark was observed until signs of vital re-action had appeared, and on their disappearance, the mark on the neck became deeply ecchymosed.

Perhaps the production of the ecchymosed circle may depend much upon the manner in which death occurs. If it takes place through syncope, there will not be sufficient blood in the vessels of the surface to occasion ecchymosis ; but, where violent and protracted struggles precede death, it will be always likely to be produced. It may be asked whether the appearances occasioned by the cord in an individual suspended during life, may be produced after death. There seems to be no good reason why the same principle which is applicable to ecchymosis generally, should not also apply to this form of it. If such be the fact, the livid circle supposed to characterize hanging during life, may be produced by suspension soon after death. Accordingly, Orfila has proved, by experiments, that up to eighteen hours after death, precisely the same appearances may be produced as in suspension during life. Dr. Casper also succeeded in producing the same effects up to two hours after death. The ecchymosed circle cannot, therefore, be claimed as evidencing the fact of suspension during life, although any very considerable effusion of blood, or injury done to the neck, would afford a strong probability of suspension during life. *Guy*, 426.

3. *State of the genital organs.* The genital organs of both sexes have been affected in death by suspension : congestion and tumefaction have occurred in both. At the moment of strangulation, the penis has been several times discovered to become erect, and sometimes the emission of semen has been observed. Redness of the labia, and discharge of blood, have been observed in the female. This effect produced upon the genital organs is probably caused by the action of the cord upon the cerebellum. The presence of erection and emission would, therefore, be evidence of death by hanging ; but the absence of either, or both, would not furnish evidence to the contrary.

2. The second medico-legal question is, *was the hanging accidental, suicidal, or homicidal?* The occurrence of accidental hanging must, of course, be extremely rare ; but, nevertheless, it has happened. Some three cases are given by *Mr. Taylor, p.* 424 – 5, in which it was purely accidental. Although, therefore, its accidental occurrence is possible, yet the principal points of enquiry will have reference to its *suicidal* or *homicidal* character.

As between these two, the prima facie presumption is always in favor of the former. Hanging, as a means of murder, has seldom ever been resorted to. The very great disproportion of strength required to accomplish it, would render it, in most cases, entirely inadmissible. The possibility of death from this cause must, however, be admitted. The one party may be feeble, the other strong and healthy. So, also, there may exist intoxication, stupefaction by narcotics, or exhaustion from any cause. Or, there may be a combination of two or three against one individual. In general, there would be found about the body marks of injury inflicted during life, as there might be expected to be severe opposition offered on the part of the victim, unless weakness, intoxication, or stupefaction prevailed to so great an extent as to preclude it. It should be borne in mind, however, that marks of injury may be inflicted upon himself by a suicide; or they may possibly be of accidental occurrence after suspension, arising from the body's coming in contact with articles of furniture or other things around it.

It was once supposed that a certain position of the body—for instance, the feet or some part of it touching the ground or floor—was inconsistent with the fact of suicide. This has been discovered to be an error. Death has been caused by suicide, when the posture was such that it must clearly have been the result of strangulation, the suicide leaning forward so as to compress the wind-pipe. In one case of suicide, the body was found partly reclining on a bed, but suspended by the neck from a cord which was fastened to a nail. *Guy*, 429. This is probably owing to the quick abolition of all consciousness when respiration is suspended, and the free return of the blood from the head is prevented.

8. What are the causes, appearances, signs and indications of death from STRANGULATION, and the medico-legal questions connected with it?

This mode of death is essentially the same as that of hanging. It may be effected either by the uniform pressure of the ligament around the neck, or by pressing directly upon the trachea. The differences observable between the former and death by hanging are,

1. The mark of the cord, in case of strangulation, is usually lower down on the neck than that observed in case of hanging.

2. It is more horizontal, that produced by hanging being generally more or less oblique.

3. It is plainer, and more distinctly ecchymosed, than that made by hanging, as it is a mode of murder generally more violent. The distinctness and extent of this ecchymosed circle will depend mainly upon the nature of the instrument with which death is produced, and the amount of force used in its production. Where the instrument is merely a handkerchief, and soft and yielding, the circle will be far less livid and ecchymosed than when a hard cord is made use of. There is considerable variety in the instruments used, and these will somewhat vary the kind

of death and the appearances presented by the body. In using the bowstring, as practised by the Turks, the ligature is drawn so tight as at once to cut off all communication between the lungs and the atmosphere. Here, the death is sudden. In other cases, where a feeble and imperfect respiration is for some time kept up, there is more or less struggling, and not unfrequently suffusion and distortion of the face 2 *Beck*, 129.

The appearances internally presented on a post-mortem examination, will not vary essentially from those observable in the case of hanging. The more sudden the death, through the total interruption of respiration, the more distinctly marked will be the peculiar indications appearing on such an examination.

1. The first medico-legal question presented may be thus stated, *Was the strangulation the cause of death, or was it resorted to after death to conceal the real cause?* That which is most relied upon to furnish evidence that the strangulation occurred during life, and was the cause of death, is the well defined ecchymosed circle around the neck, where a ligature has been employed, taken in connexion with the indications of turgescence about the countenance. The application of a ligature, a short time after death, may cause some degree of ecchymosis; but, in that case, there will be no turgescence of the countenance. The application of the ligature six hours after death, will produce no livid ecchymosed circle, resembling that caused by it during life. It is asserted, with considerable confidence, that the reddish ecchymosis left by the cord will be found only in those cases where it has been applied previous to death.

The most perplexing case that has been brought forward, in which this question came up for settlement, was that of Sir Edmundbury Godfrey, which occurred in 1677. His body was found in a ditch, his own sword passed through his chest, his gloves and other articles of dress so disposed as to create a suspicion of suicide. Although the sword had passed through the heart, yet no blood was found at the wound; around the neck was an ecchymosed mark an inch broad; the face was livid and suffused, and the eyes blood-shot. The cervical vertebræ were fractured; and the neck was so flexible that it could be turned from one shoulder to the other. There were, also, two wounds found on the body; the one going no further than the bone, having struck on a rib; and the other through his back. He was of a melancholy temperament, and labored under a great depression of spirits. This was probably a case of strangulation, accompanied with the infliction of other injuries. *Guy*, 432; 2 *Beck*, 130. Strangulation is sometimes effected by the hands as well as by a cord. In such cases of manual strangulation, there will be no livid ecchymosed circle around the neck; but, in place of it, will be found partial discolorations of an indistinct form, and occasionally the positive marks of fingers. More or less resistance in such a case is generally offered. Life continues for some time, and the internal evidences of death by strangulation are less strongly marked. In one case of strangulation, there were patches of extravasated blood found on the throat, with abrasions corresponding to the nails. Bruises were also observed on the chest. The brain, on dissection, was found turgid with blood. The victim had been strangled with a pocket-handkerchief; the knees of the murderer having been pressed on the chest.

2. A second medico-legal question is, *Was the strangulation accidental, suicidal, or homicidal?* So far as the first is concerned, it is very unfrequent, but not impossible. Several instances are on record of accidental strangling. In one case, a woman went to bed with her bonnet on, in a state of intoxication. In the morning, she was found strangled in her bonnet strings. So, also, accidental strangulation has occurred from individuals carrying weights on their backs, which were supported by bands passing round the head or chest. The slipping of these has sometimes caused strangulation, by compressing the trachea. In all such cases, the position of the body, and other circumstances, will generally afford sufficient indication as to the particular manner and cause of death. *Taylor*, 434; *Guy*, 433.

Suicide by strangulation is certainly not a very common occurrence, as it may be naturally supposed that the hand of the individual would lose its strength at the moment of compression. There are, however, several instances of suicide committed by such means. In one case, the suicide was found lying dead in his bed, with two cravats twisted several times round his neck. More frequently, some kind of stick is used to produce the necessary compression. In one case, a poker; in another, the handle of a pot was thrust through the tie of the handkerchief, and then twisted round and round, until the purpose was accomplished. The place and circumstances are much relied upon to indicate whether it be a case of suicide or homicide. The occurrence of a case of pressure on the trachea would afford a very clear indication of homicide. In general terms, hanging may be said to be the more frequently suicidal, and strangulation homicidal, in their occurrence.

9. What are the causes, appearances, signs and indications of death by SMOTHERING, and the medico-legal questions connected with it?

Death by smothering is accomplished by covering the mouth and nostrils, in such a way as to exclude the ingress of atmospheric air into the lungs. This may take place through accident, or force; and this may perhaps be stated as the only medico-legal question that will be likely to present itself in this form of death. A person intoxicated, or one who is helpless from any other cause, may fall on the face, and become suffocated by water or loose earth. In all such cases, the situation and circumstances under which the body is found, would indicate the accidental character of the event.

In 1828, the city of Edinburgh was the scene of excitement, arising from the discovery that two persons, by the names of Burke and Hare, were in the practice of killing individuals by smothering, and then selling their bodies for the purpose of dissection. The course pursued was, first to intoxicate the victim, and when he was on the floor, one would keep him down by throwing on him the weight of his body, covering the mouth and nose with one hand, applying the other under the chin, thus continuing to hold for ten or twelve minutes, until life was extinct. 2 *Beck*, 145.

In the case of Margery Campbell, the last one of Burke's victims, the body presented the following appearances; the examination having been made two days after death: The joints flaccid; features composed, red, and rather more turgid than natural; lips dark; conjunctivæ of the eyes, even in the horizontal position of the body, much injected with blood; a little fluid blood on the left cheek, apparently from the nostrils; tongue not protruded; the scurf skin under the chin much ruffled, and the surface of the true skin dry and brown when denuded, but without blood or surrounding ecchymosis; the integuments everywhere free from lividity, except on the face; no injury or effusion about the wind-pipe or cartilages, but the os hyoides and thyroid cartilage were further apart than usual, in consequence of the stretching of the interposed ligament. The internal organs were healthy, and particularly the lungs. The blood throughout the body was black and fluid, and accumulated in the large veins, and in the right cavities of the heart.

This mode of death, particularly where opium or alcohol has previously been administered, to stupify and render the system insensible, leaves very few and imperfect traces upon the organization. The rapidity with which death takes place leaves no opportunity for the accumulation of blood in the venous system. There will be, therefore, no discoloration of skin, no turgescence of veins, no engorgement of pulmonary vessels.

10. Of persons found dead from COLD: Cases of this kind will sometimes arise for medico-legal investigation, but the exposed condition and circumstances under which the body is found; the season of the year; the absence of any injuries, or other obvious cause of death, will generally be sufficient to indicate the true cause from which it has proceeded.

The effect of a moderate degree of cold is to invigorate the system, but when it becomes intense, it creates a sensation of numbness and stiffness in the muscles of the limbs and face, accompanied with paleness of the skin. Loss of sensibility, torpor, and profound sleep follow, all the vital functions gradually becoming more and more languid, until life entirely ceases.

The effect of cold upon the surface, is to contract the capillaries of the skin, and thus drive the blood into the internal organs. The great vessels of the spleen, liver, lungs, and brain, are more or less gorged with blood. The nervous system, under the influence of intense cold, gives rise to various phenomena, such as numbness, torpor, somnolency, giddiness, dimness of sight, tetanus, and paralysis.

The effects of cold vary much according to the age, strength, and habits of the individual. Of these, the young, the aged, the weak and infirm, and those accustomed to habits of intoxication, are much sooner frozen to death than those possessing firm, vigorous, healthy constitutions. Some individuals seem to have a peculiar power of resisting cold far beyond others. From the calm, quiet manner in which death generally supervenes, and from the absence of all acute suffering, it seems probable that the principle of vitality is equally diminished in every part, and that the functions of no particular organ are exclusively disturbed.

It was remarked by the French soldiers in their retreat from Moscow, that those affected by cold, often reeled about as if in a state of intoxication ; that they complained of vertigo and indistinctness of vision ; and, under a feeling of lassitude, finally sank into a state of lethargic stupor, from which it was impossible to rouse them.

The traces left in the system, by this kind of death, are not very peculiar or well marked. There is paleness of the surface, and general congestion of the internal organs, particularly of the lungs and gastro enteritic mucous membrane. So also there is congestion, but not extravasation, of the vessels of the brain. There has been observed to be serum effused in the ventricles of the brain. The lethargic state has been attributed by some to the greater determination of blood to the brain.

11. Of persons found dead from Burning :

The first question that will here naturally arise, regards the accidental or intentional character of the burn. If accidental, it will have occurred during life. If intentional, its occurrence will be after death, the object being to conceal the real cause and mode of death. This directly involves the question *whether the burning took place during life or after death?* The merit of investigating and settling this question, appears to be due to Dr. Christison. The following are the conclusions he arrived at:

A burn inflicted during life, presents these appearances, viz: Immediately surrounding the burnt spot, there is a narrow white line; external to this, a second, of a deep red tint; and this latter, at its outer edge, runs by insensible degrees into a diffused redness. The diffused redness may be removed by gentle pressure, and disappears after death. The deep red line, however, is permanent. These appearances are observable in from five to fifteen, and occasionally as late as thirty seconds after the burn. The next appearance, in point of order, is that of blisters filled with serum. The period at which the blisters rise has not been accurately determined, but in most cases, a very few minutes only are required. If, therefore, life is extinct within a few minutes of the injury, blisters may be altogether absent.

After scalds, vesications make their appearance in a very few minutes, but in young children it is said that some hours transpire before they appear. Vesication is not an invariable effect of the application of heated bodies. *Guy*, 495.

The Doctor also made experiments testing the effect of fire upon bodies soon after the extinction of life. He was unable at all to produce in such, the deep red line not removable by pressure. In some of the experiments, blisters were produced, but there was this material difference between those, and such as were raised during life, the former were filled with air, and the latter with fluid; and on the removal of the cuticle, the cutis was found free from moisture.

In experiments made an hour after death, there were no appearances presented that could be mistaken for vital changes; all the effect being a ruffling of the cuticle, and a drying up of the parts to which the heated body was applied.

From all his experiments, therefore, the deep red line, and the vesicle filled with serum, are to be regarded as vital changes and the results of vital reaction.

Another medico-legal question that may become important to settle, regards *the possibility of spontaneous combustion, human combustion, or the preternatural combustibility of the human body.*

This, if it occurs at all, is so seldom, that it seems unnecessary to dwell upon it at much length. There are several curious cases on record, that seem, some of them, so well attested, as to incline the belief to their possibility. Orfila has described, particularly, the phenomena attending spontaneous human combustion. He says a bright flame appears over the part that is about to be attacked. The flame is not readily extinguished by water, and, indeed, frequently the addition of water only serves to increase its activity. Deep eschars form on the part affected, accompanied by convulsions, delirium, vomiting, and diarrhœa, followed by a peculiar state of putrefaction and death. The process is said to advance with extreme rapidity, but the body is never entirely consumed. While some parts are half burnt, others are completely incinerated, a carbonaceous, fetid, unctuous ash remaining. The hands and feet commonly escape destruction, while the trunk is usually entirely dissipated. The wooden, or other combustible articles of furniture, situated near the individual, are either uninjured, or but imperfectly consumed. The clothes covering the body are commonly destroyed. The walls and furniture of the apartment are covered with a thick, greasy soot, and the air is impregnated with an offensive empyreumatic odor.

This phenomenon is stated to have been chiefly observed in corpulent females, advanced in life, and especially in those subjects who had been long addicted to the abuse of spirituous liquors. *Guy*, 497.

There seems to be no authenticated case on record, of the occurrence of *spontaneous combustion*, that is, of combustion taking place merely from the operation of *internal causes*. In all the recorded cases, an ignited body has been present, so as to afford a very clear presumption that the fire was communicated to the dress of the individual.

That some peculiar circumstances have rendered the human body preternaturally combustible, and that some occasions have occurred when this has been fully demonstrated, seems now to admit of little doubt. What those circumstances are, is not clearly settled. As the subjects to whom this has occurred, have been almost, or quite, uniformly addicted to the use of spirituous liquors, it has been urged that an alcoholic impregnation of the body may be sufficient to account for all the phenomena. By others, this seems, with very good reason, to be doubted. The facts that have been observed and recorded, are probably too few in number, as yet, to admit of our coming to any very satisfactory conclusion in regard to the cause or causes of this singular phenomenon.

In a late number of the Liverpool Mercury, is a statement of the following singular case: A man noted for his intemperate habits, while drinking with his comrades, laid a wager that he would eat a lighted candle. His bet was taken, and scarcely had he introduced the flaming candle into his mouth, when he uttered a slight cry and fell powerless to the ground. A bluish flame was seen to flicker about his lips, and on an attempt being made to offer him assistance, the bystanders were horror-struck to find that he was burning internally. At the end of half an hour, his head and part of his chest were reduced to charcoal.

12. Of persons found dead by LIGHTNING:

The electric fluid seems to be guided in its direction by the best conductors. Where, in this respect, there is an equality, lofty objects are more likely to be struck than low ones. Hence the human body, unless under circumstances that create an exception, is likely to escape when surrounded by more elevated objects. As the human body is itself a very good conductor, it is not perfectly safe during a thunder-shower, when in an open space, and at a distance from any other object, as it would then be the most prominent, and the best conductor.

Whenever the electric fluid strikes an individual, it produces a shock upon the brain and entire nervous system. It was the opinion of Dr. John Hunter, that it caused the instantaneous and entire destruction of the vital principle in every part of the body, and as a consequence, produced a great relaxation of the muscles. Where it does not prove immediately fatal, it causes insensibility; deep, slow and interrupted respiration; pulse soft and slow, and pupils dilated, but sensible to light. A slight shock produces a stunning effect.

The post-mortem appearances exhibit considerable variety. In some cases, no marks of violence will be discovered on the body; in others, there will be found marks of violence which will be sometimes very severe. More generally, a contused or lacerated wound will be found about the spot where the electric fluid entered and passed out. Sometimes an extensive ecchymosis will appear, the more commonly on the back, along the course of the spinal marrow. In cases where the clothes have been set on fire, there may be seen marks of burns, but these will not be produced by the electric fluid. The clothes are very generally torn and singed, giving off a peculiar odor. If there are metallic substances about the individual, they will present traces of fusion.

The wounds are sometimes of such a character that they resemble injuries produced by mechanical force, and are liable to be confounded with them. They generally present the appearance of lacerated punctures, similar to a stab produced by a blunt dagger. In one case, a deep wound was produced in one thigh, almost laying bare the femoral artery. This should induce great caution to avoid mistaking the effects of the electric fluid for violence effected by mechanical means. In doubtful circumstances, the situation of the body and the place where it is first discovered, may afford an indication as to the cause of death ; also, the melted state of any metallic substances found about it, together with the rent or torn and burnt condition of the clothes.

13. Of persons found dead from STARVATION.

Death by starvation may be the result of accident or homicide, but very rarely the latter. It has, also, been a means of suicide ; but seldom, unless in case of insanity. When abstinence has been for a long time practiced, there is pain experienced in the epigastrium, which is relieved by pressure ; a general emaciation of the body ; the eyes and cheeks sunken ; the bones projecting ; the face pale and ghastly ; the eyes wild and glistening ; the breath hot ; the mouth dry and parched ; an intolerable thirst prevails ; delirium ; great prostration of strength ; a fetid odor exhaling from the body ; some of the mucous membranes becoming red and inflamed ; and finally death takes place in a fit of maniacal delirium, or in horrible convulsions. *Guy*, 516; *Taylor*, 456.

There is considerable difference in the period of time at which death takes place from this cause. It will differ with the age, sex and strength of the individual. It will, also, depend much upon whether free access has been had to liquids during the period of abstinence. It has been ascertained, by experiment, that animals live more than twice as long when they have access to water, as when they are excluded from it. It is said, that where the abstinence was perfect, death would not probably take place under a week or ten days. There are, however, some cases of voluntary starvation on record, in which life has been prolonged for a considerable period of time. In the case of Viterbi, death was protracted to the twenty-first day; and in the more remarkable case of Guillaume Granet, who resorted to starvation to avoid punishment, life was prolonged to the fifty-eighth day, when he expired in convulsions.

The post-mortem appearances are, great emaciation of body, and the exhalation from it of a fetid odor. The eyes are found red and open, the skin, mouth and fauces dry, and the stomach and intestines empty and contracted. The gall-bladder is large, and distended with limpid, greenish yellow bile. The heart, lungs and large vessels are collapsed and destitute of blood. The process of putrefaction commences soon after death, and runs its course very rapidly.

The post-mortem appearances are hardly sufficient to furnish alone clear and satisfactory indications of death from starvation. It is seldom, probably, that the medical jurist will be called upon to decide from these alone, whether death has resulted from that cause or not. When accidental, it is usually coupled with cold or exposure, in which case all the accompanying circumstances will generally afford proof quite sufficient, at least when sustained by the post-mortem appearances.

CLASS III.

Under this class will be embraced questions arising out of diseases, or affections in the nature of disease, that disqualify; principally insanity, including all the different forms of mental alienation. This is, probably, the only topic in this class that will require discussion. It is not very material by what name it is called. Its usual appellation has been Insanity; but that term, according to its true signification, will not cover all the different forms intended to be included under it. Perhaps, the better term to select is mental alienation; although even that will hardly be deemed broad enough to apply to those diseased affections which, like idiocy, are congenital.

MENTAL ALIENATION.

What we have to say upon this general subject will be embraced under the following heads, viz.:

1. Its definition.
2. Its seat.
3. Its history.
4. It's causes.
5. The principle upon which legal exemption proceeds, the division legally recognized, together with the methods of procedure known to the law.
6. Its classification; its different forms; each being considered in reference to the appearances and proofs that establish it; and the legal consequences that attach to each.

1. Its definition. To define Insanity, or mental alienation, in such a way as shall cover all its phenomena, and yet be sufficiently distinctive, is a matter of extreme difficulty. So widely have definitions varied, that "some," says Dr. Good, "are so narrow as to set at liberty half the patients at Bethlehem or the Bicêtre; and others so loose and capacious, as to give a straight-waistcoat to half the world." The difficulty has generally been

that definitions have been adopted based only upon some particular forms or phases of the disease, and although true as to them, are untrue as to others. Dr. Reid, for instance, places the seat of the disease in the imagination, and says that "exalted imagination is insanity." John Locke considered madmen as not having lost the reasoning faculty, but that in joining together incongruous ideas, they mistake them for truths, and err as men do that argue right from wrong principles; the violence of their imaginations taking their fancies for realities. Dr. Battie defines madness to consist in false perceptions. Dr. Arnold divides the disease into two grand species, one of which he calls notional, and the other ideal insanity. Dr. Crichton defines the disease as consisting in general derangement of the mental faculties, in which deceived perceptions are mistaken for realities; with incoherent language and unruly conduct. Dr. Conolly considers mental derangement to consist in the impairment of any one or more faculties of the mind, accompanied with, or inducing, a defect in the comparing faculty. Mr. Neville defines it to consist in disordered function of the brain generally, or of one, or of several of its parts, without consciousness of this derangement on the part of the individual affected, and without notable or necessary implication of the functions of any other system in the body. Idiocy, he defines to be deficiency of mental manifestation, from lesion, imperfect development, or absence of one or more of the cerebral organs. Dr. Spurzheim defines insanity to be an aberration of any sensation or intellectual power from the healthy state, without being able to distinguish the diseased state; and the aberration of any feeling from the state of health, without being able to distinguish it, or without the influence of the will on the actions of the feeling. In other words, the incapacity of distinguishing the diseased functions of the mind, and the irresistibility of our actions, constitute insanity. The last definition is, perhaps, the most elaborate, but is not in all respects true; as there may be derangement on a particular topic, with the perfect ability to distinguish it from the sounder views of others. Perhaps the definition the least exceptionable is that suggested by Dr. Spurzheim, viz.: *An aberration of the manifestations of the mind from* *their ordinary, normal, healthy state.* This, it is true, is very general, little distinctive, and cannot be said to cover all its forms, as the term aberration can hardly be applied to those diseased affections which, like idiocy, are congenital. Still, as the definition is plain and obvious; has a direct reference to the mental character of the disease; and really embraces the great fact which in any given case always presents itself as a distinct subject of inquiry, viz.: The nature and extent of change which has taken place in the action of the faculties composing the mind, in reference to which the enquiry is made, we shall adopt it.

2. Its seat. This, in reference to its bearings on medical jurisprudence, is not very material to be considered. It must either be seated in the mental faculties themselves, and thus be a disease of the spiritual nature; or in the brain, the material organ, through which the mind here displays itself. We suppose its seat to be the latter, for the following briefly alleged reasons.

1. It is more reasonable in itself than the supposition of a diseased soul; because, if the latter be diseased, we can perceive nothing in the nature of death to divest it of that disease; and, also because, as far as our experience goes, whatever is subject to disease is also subject to death.

2. It is in harmony with all other diseased affections, as they all proceed from suffering organs.

3. It is quite obvious from an investigation of some of the causes. Idiocy, for instance, may result from defective development of brain, or from structural derangement. Blows, or other injuries affecting the brain, may result in mental alienation.

4. From the physical phenomena attending it, is drawn an argument. The increased pulsation, the furred tongue, the constipation of the bowels, the peculiar caste of countenance, and the preternatural heat, sometimes observable, either of the whole brain or of some one particular part of it, are all indicative of physical disease.

5. The morbid phenomena, or pathological changes, sometimes discoverable in the brains of those who have been afflicted with mental alienation. These, it is true, are not always such obvious lesions as are perceptible on dissection. The brain is an ex-

tremely delicate organ, and it is not every kind of irritation that will leave its traces there after death. Some pathological changes may exist, without becoming the objects of the senses. Whereever the alienation has been long continued and severe, and the death has finally resulted from it, there will be likely to be such lesions occurring in the brain as will be obvious on dissection.

But, although a disease of the material organ, yet the symptoms disclosing it to the medical jurist, consist in the defective, deranged, or perverted action and manifestation of the faculty or faculties of the mind.

3. Its history. There are fewer pages in the history of human progress more marked or peculiar, than those on which are recorded the varying views of men in reference to mental alienation. It was once looked upon as a special judgment from God; as beyond the reach of remedies; as an infliction that would justly warrant barbarity and savageness of treatment, and rightfully exclude its suffering subject from all the privileges of social intercourse, and all sympathy with human feelings. Hence, chains, and imprisonment, and darkness, and dungeons, with the infliction frequently of horrid cruelties, have, in times past, been the almost invariable lot of those whose only crime was the loss of their reason. It is shocking to know that men could ever be led to commit such horrid enormities. Nor have their views, or their conduct, been changed until within the last half century. The early part of the nineteenth century was signalized by the strong efforts of Pinel in France, to impress upon the mind of man different views in relation to mental alienation, and more especially to the conduct to be pursued towards the insane. He knocked the chains from his swollen limbs, gave him free access to the atmosphere and to light, and showed that he reposed confidence in him as a moral being. The result was successful beyond all measurable calculation. The world owes a debt of gratitude to Pinel, which it will never find it in its power to repay. He had the moral courage to stand up against the public opinion of his fellow-men, and the raving of the maniac, and in the face of both to proclaim and enforce the truth. Since his time, public opinion has essentially changed. This terrible in-

fliction is now mourned as a misfortune, instead of being visited as a crime. It is no more regarded as furnishing just matter of reproach, than the bereavement of motion in a paralyzed muscle. The sounder views that have been entertained in reference to mind, both in its normal and abnormal action, have also resulted in more clearly understanding the deranged or diseased conditions to which it is occasionally subject.

4. Its causes. With these, the mere medical jurist has little concern. A very brief allusion, therefore, will only be made to them.

The brain is the centre of many distinct and differing relations. Of these there are at least three different kinds:

1. The first set of relations are those which it sustains with the different organs in the organism in which it is found. It supplies to these the nervous power or energy, and derives from them that which contributes to its growth and continued support. Hence a system of mutual and reciprocal influences exists between the brain and every other important organ in the animal economy. These may be termed *organic relations.*

2. The brain is the great sensitive centre. Between it, therefore, and external nature, exist the relations of sensation. In virtue of these, the objects in the material world make their impressions, and are recognized as pleasant or painful. These are the *physical relations.*

3. In the brain are the organs of thought, reflection, emotion, volition; all, in fine, that goes to constitute the mind. Here, then, is the source of the higher relations, those existing between it and the unseen, spiritual world. It is in virtue of these that man becomes a being of reason, and a subject of God's moral government. These may be termed the *moral relations.*

It is proper to premise here, that we know little or nothing of the essence of mind. Our knowledge of it is derived from what we are conscious of in ourselves, and from what we observe of its sane and deranged action in others. From all we are able to glean from these two sources of knowledge, we are not disposed to regard the mind as a unit, or single general power, capable, originally, of acting with equal energy in every direction or distinct department, to which its operations might extend; but rather as a congeries, or assemblage of faculties, connected together by a common consciousness, and by modes of activity enjoyed by all those which possess the same general character. These faculties are so many powers or instruments of thought or of feeling, of a definite nature, and having specific functions. In virtue of that nature and of those functions, each is independent of every other; may act or rest singly; be strong or weak; sane or deranged in its manifestations. Upon this principle only is mental alienation intelligible; and hence its general assumption by the most approved writers upon that subject.

The causes of mental alienation are in accordance with the three systems of relations just enumerated. They are *organic*, *physical*, and *moral*.

1. The organic, or, as they have been termed, sympathetic causes, are to be found in the relations existing between the brain and other large organs of the body. The existence of these admits of the transference of disease from other organs to this. Thus erysipelas, gout, rheumatism, and repelled cutaneous affections, may be productive of mental alienation. More especially will suppressed lochia, menses, milk in nurses, hæmorrhoides, old drains dried up, as setons, issues, &c., result in derangement. Sometimes general diseases, such as small pox, measles, scarlatina, and fevers of various sorts, affect the whole body, but occasionally they are productive of morbid changes in the brain, resulting in mental alienation.

2. The physical causes of mental alienation may arise either,

1. From defective development, or derangement of structure of the brain, from the operation of internal causes. From the first may result idiocy, and from the second, hydrocephalus internus. Or it may arise,

2. From external violence, or from the action of local causes expending their hurtful influence upon the brain. A severe blow on the head may entirely suspend all mental action; a fracture of the skull and wound of the brain, may give rise to acute inflammation, to delirium, and sometimes to more permanent men-

tal derangement. Intense cold may derange the operations of the mind.

Baron Larry states that in the retreat of the French army from Moscow, many cases of insanity, in every variety of form, accompanied by a great number of deaths, were produced by the continued action of the intense cold upon the brain. So also great heat may derange the health of the brain, and give rise to mental alienation. If the uncovered head be long exposed to the direct rays of the sun, a severe and long continued paroxysm of mania may be the result. It may also give rise to more acute cerebral disease, accompanied, or in part manifested, by violent delirium. Thus it must be apparent, that the physical causes of mental alienation are very numerous.

3. The moral causes are probably the most fruitful in the production of all the forms of mental alienation. There may be two distinct modes in which these causes may operate:

1. One or more of the mental faculties may be possessed of such inordinate, disproportional strength, as that by its own inherent activity, it may be pushed into an abnormal state or condition:

2. One or more faculties possessing less comparative strength, may, in consequence of their union with others, be urged on to an intenser degree of action than they are able to endure, and thus become deranged in their manifestations. The attainment of wealth, honor, power, furnish to some the strongest possible inducements, and lash up those faculties that are the most instrumental in procuring them to their highest possible degree of action: And then all the sentiments and emotions, hope and fear, joy and sorrow, are in unremitted activity, and often at the extremest degree of tension. Losses, failures, unfortunate occurrences, strike with a force severe in proportion to the anticipated success. Whatever stirs deep emotion, or excites to intense and continuous thought, may be productive of excessive and irregular action. These causes, operating upon the patient, have been known to affect even the unborn child. Esquirol has observed that during the agitated periods of the French revolution, many ladies then pregnant, and whose minds were kept

constantly on the stretch by the anxiety and alarm inseparable from the epoch in which they lived, and whose nervous systems were thereby rendered irritable in the highest degree compatible with sanity, were afterwards delivered of children whose brains and nervous systems had been similarly affected by the state of the parent, to such a degree, that, in future life, as children, they were subject to spasms, convulsions, and other nervous affections; and in youth, to madness, imbecility, or dementia, almost without any exciting cause.

He relates one instance of a pregnant woman being terrified by the threats of her husband when intoxicated, and the child, after its birth, was so much affected by its mother's agitation, that it continued subject to panic terrors until the age of eighteen, and then became completely maniacal. *Combe's Insanity*, 98-9.

It is principally from these causes that an advanced civilization is so productive of the different forms of mania. It carries in its train so much that contributes to the excessive excitement of the different faculties, and that which administers to the morbid growth of some, that much insane manifestation is the inevitable result. Among the savage tribes of men on this continent, insanity was unknown. It has followed in the wake of civilization, and seems to prevail the most extensively where there is the largest liberty of thought, speech, and action. In Great Britain it abounds much more than on the continent, and in England it is more frequently to be met with than in other parts of Great Britain. *Spurzheim's Insanity*, 123.

In the United States it is probably much more frequently to be found in proportion to the population, than among any other people. The exciting scenes of our politics, the deep and absorbing interest that sometimes attaches to religious revivals, the rage for pecuniary speculation that occasionally seizes upon a whole community, are all in themselves peculiarly well fitted to impart intense activity to those moral causes that dethrone the reason, and subvert the laws of mind.

5. The principle upon which legal exemption proceeds, the division legally recognized, together with the methods of procedure known to the law.

Law is understood to mean "a rule of civil action, prescribed by the supreme power in the state, commanding what is right, and prohibiting what is wrong." The rule of civil action thus prescribed is specific, and has its own appropriate sanctions, consisting in the rewards offered to the obedient, and the punishments inflicted upon the disobedient. In order, however, that any law should be binding, two conditions are essential; the one is, that the being who is the subject of it, should possess sufficient mental capacity to understand the rule and comprehend the consequences of its violation; and the other is, that superadded to that capacity, he should be a free moral agent, the master of his own actions, and capable of proceeding upon motives common to the race to which he belongs. All, then, on the one hand, in any civilized community, who are sunk so low in intelligence and comprehension as that the rule and its sanctions are beyond their reach, should be visited only for the purposes of protection against the injurious acts of others; and all those on the other, who by reason of delusion or halucination, or from perversion of the intellectual or moral powers, are unable to act upon commonly received motives, or who have ceased to be masters of their own actions, should be visited also for the purpose of protection; but very frequently it would be required to be a protection of the community against them. Thus the principle of legal exemption is derived from the moral nature of the law itself; it being as manifestly absurd and irrational to punish either one of these classes for disobedience, as it would be to punish a mere machine, either because it would not go at all, or because when it did go, it went all wrong.

The jurisprudence of all civilized nations has never failed to recognize these two great classes of human beings who are deprived of their reason.

The Roman law divided the insane, or *dementes*, as they were termed, into two classes. In the one was included all the *mente capti*, or those whose understanding was weak or null; and in the other, all the *furiosi*, or those who were restless and furious. The French and Prussian codes make use of the terms *dêmence*, *fureur and imbécilité*, without undertaking to define them.

The English common law originally recognized but two forms of mental alienation, and these were termed *idiocy* and *lunacy*.

An idiot was legally defined by Fitzherbert, at a very early period, to be a person who cannot count or number twenty pence, nor tell who was his father or mother, nor how old he is, or that hath no understanding or reason—what shall be for his profit, or what for his loss: but if he have such understanding that he knows and understands his letters, and to read by teaching or information of another man, then it seems he is not an idiot, which seems more properly to belong to one who has had no understanding from his birth, and is, therefore, by law, presumed never likely to attain any. *Fitz. N. B.*, 583, *ed.* 1652. This definition the medical profession, and probably the legal also, would now consider altogether too restrictive for the term idiot, as there are some degrees of idiocy much in advance of those necessarily embraced in this definition.

Lunacy was derived from the term *luna*, the moon, and was so called from the supposed influence which the moon exerted, or was presumed to exert, over the disorder. This term signifies in its legal acceptation, one who has had understanding, but, by disease, grief, or other accident, hath lost the use of his reason. A lunatic is properly one that hath had lucid intervals, sometimes enjoying his senses and sometimes not. 4 *Coke*, 123; 1 *Black. Com.*, 304.

At a very early period a general term was sought, under which might be included all the possible forms of mental alienation. For this purpose the term *non compos mentis* was adopted, and it was used to signify a person "out of his senses." The English phrase equivalent to it is "of unsound mind," which was once understood to import a total deprivation of sense.

After thus including under one generic term all cases of deranged mind, an effort was made by Lord Coke to define the different classes that are included under it. He divides them into four classes:

1. *Idiot*, or fool natural, who from his nativity by a perpetual infirmity is *non compos mentis:*

2. A person who was of good and sound memory, but by sick-

ness, grief, or other accident, wholly loses his memory, and understanding:

3. *A lunatic—lunaticus*, who has sometimes his understanding and sometimes not; *qui guadet lucidis intervallis*, and, therefore, he is called *non compos mentis* so long as he has not understanding:

4. A person who by his own vicious act, for a time deprives himself of his memory and understanding, as he that is drunken; but such a person has no privilege by this voluntary contracted madness. *Co. Litt.*, 247, *a*; 4 *Bl. Com.*, 25; *Shelford on Lunacy*, 1–2.

The law interferes on three different occasions to afford relief to the *non compos mentis:*

1. On the occasion of their general action while in that state and condition. The object and effect of this interference is to establish the general fact of unsoundness of mind, upon the well ascertained proof of which, they are deprived of all control over their property; divested of their civil rights in relation to their estates; absolved from all duties; and protected against the injurious acts of others. This has reference to the future:

2. On the occasion of a single act done, as a contract made, property conveyed, or any thing of that kind transacted; the object of which is, to avoid the act as done by a mind deranged, and therefore incompetent to its performance. This has reference to the past, and not the future:

3. On the occasion of a criminal act done, as the taking, without consent, the property of others; the commission of incendiarism; or the taking away of life. The object of interference here is to exonerate the *non compos* from the legal consequences of an act, in others criminal., but in him innocent, on account of the malady under which he labors. This also has reference to the past.

The first is accomplished by the issuing, execution, and return to a commission. The second, by the trial of an issue upon the very act sought to be avoided; and the third, by his trial upon the commission of an alleged crime, in which his sanity or insanity is tested in reference to such commission.

Originally commissions were issued for the purpose of enquiring whether the individual was an idiot ex nativitate, or a lunatic, and in consequence thereof, incapable of governing himself and managing his worldly affairs. The finding in the one case had a different consequence attached to it from what it had in the other. An idiot ex nativitate, having been such from his birth, was legally presumed to remain so through life, while a lunatic, having once had the possession of his reason, was presumed capable of again regaining it. Hence the commission might be superceded in the latter case, and the individual on his recovery, be restored to his rights and property, but not in the former. In the former case, it is usual to state in the inquisition the period of time during which the person under examination has been a lunatic or of unsound mind, but not in the latter, although if stated, it is regarded as surplusage and does not vitiate.

In England the jurisdiction over all cases of idiocy, lunacy and unsoundness of mind, has been exercised by the lord chancellor, not, however, acting as the court of chancery, but under a special separate commission from the crown, authorising him to take care of the property, and for the benefit of the lunatic. The care and custody both of the idiot and lunatic, and their estates respectively, originally belonged to the king alone. *Shelford on Lunacy*, 10; *ex parte Phillips*, 19 *Vesey*, 122. Anciently the king could grant the care of an idiot's person, and the profits of his estate during his life, without account, except for necessaries; but since the revolution, the crown has always granted the surplus to some of his family. *note c in* 1 *Paris & Fonblanque*, 290.

In New-York, the Revised Statutes, 2 *R. S.*, 52, § 1, provide that the chancellor shall have the care and custody of all idiots, lunatics, persons of unsound mind, and persons who shall be incapable of conducting their own affairs in consequence of habitual drunkenness; and also of their estates whether real or personal. In consequence of the recent abolition of the court of chancery, the same power and jurisdiction devolved upon the supreme court.

The method by which it is ascertained whether any one is a fit subject for the exercise of this power and jurisdiction, both in England and in this country, is by the issuing of a commission, and the proceedings based upon it.

When persons *non compotes mentes* became divided into the two classes of idiots and lunatics, distinct commissions in the nature of the old writs were framed for each of them; one *de idiota inquirendo*, and the other *de lunatico inquirendo. Shelford on Lunacy*, 52. After the general term *unsoundness of mind* came into more general use, and as it was sometimes difficult to determine in advance whether the examination would result in showing idiocy or lunacy, the commission took a different style, and was called a *commission in the nature of a writ de lunatico inquirendo.*

The general method pursued, both in England and in this country, in the issuing of the commission, and the proceedings under it, is much the same. The following is a brief summary of the method of procedure. A petition is presented to the chancellor, or, in this state, to the supreme court, by some near relative of the alleged lunatic, accompanied by affidavits setting forth the facts on which the application is founded. The application is ex parte. If a case is made out sufficient to justify or require the interference of the law, a commission now generally styled in the nature of a writ *de lunatico inquirendo*, is issued, directed to a certain number of commissioners, generally three, who are named therein, and who are required to execute the commission. This must be done by means of a jury, consisting of at least twelve disinterested men, who are to meet for that purpose near the place of abode of the supposed lunatic. In the execution of the commission, the commissioners constitute the court, and as such, lay down the law to the jury, to whom it belongs, as in all other cases where their aid is invoked, to find the facts that are submitted to them. The alleged lunatic must have due notice both of the time and place of executing the commission, so that he can, if he desires, appear and contest the finding of the jury. Witnesses may be sworn, and the trial proceed as in ordinary cases, except that the cause must be submitted to the jury without the arguments of counsel. The jury either disagree and are discharged, or agree upon the verdict embraced in the inquisition, which is intended to be the answer to the commission, and to furnish a full and precise response to all the enquiries contained in it.

The legal questions that have generally arisen have had reference either to the form and contents of the commission, or to the inquisition which furnishes the response to it. One great point in controversy has been, how far relief can legitimately extend in cases of alleged unsoundness of mind and incapacity to conduct the ordinary affairs of life. This point first distinctly arose in the case *ex parte Barnsley*, 3 *Atk.*, 168, in which on a commission to inquire whether Barnsley was a lunatic, the inquisition found that from weakness of mind he was incapable of governing himself or his estate. This case was elaborately discussed, and Lord Hardwicke finally quashed the inquisition for insufficiency, holding that the finding must be that he was a lunatic, or, what was correspondent to it, that he was of an unsound mind. It was not sufficient in his judgment that he was weak and worn out with age, and incapable of managing his estate. The same doctrine was subsequently declared in *Lord Donegal's case*, 2 *Vesey*, 407.

The first departure from the strict technical rules laid down by Lord Hardwicke relative to these commissions is in 6 *Vesey*, 273; where Lord Eldon lays down the principle, that evidence may support a commission not of lunacy, but in the nature of a writ *de lunatico inquirendo*, in which he says it must be remembered, that it is not necessary to establish lunacy; *but it is sufficient that the party is incapable of managing his own affairs.* In the case of *Ridgeway vs. Darwin*, 8 *Vesey*, 65, the subject underwent a still further investigation, and in *ex parte Cranmer*, 12 *Vesey*, 445, Lord Erskine distinctly held that the jurisdiction of the chancellor embraced cases of imbecility resulting from old age, sickness, or other causes. The question he said was *whether the party had become mentally incapable of managing his affairs.* Previous to this, Lord Eldon had held that on the execution of a commission it was not necessary to establish lunacy, but that it was sufficient if the party was shown to be incapable of managing his own affairs. In all these cases, however, it was deemed necessary, in order to support the commission, that the jury should find the fact of *unsoundness of mind*, which Lord Hardwicke understood as correspondent with lunatic, and which Lord Eldon defined to be "such a state of mind as to be contradistinguished from idiocy, and also from lunacy, and yet such as made one a proper object of a commission in the nature of a commission to inquire of idiocy or lunacy."

This point came up for investigation and decision in the courts of New-York, *in the matter of Barker*, 2 *Johnson's Chan. Rep.*, 232, in which Chancellor Kent gave a somewhat elaborate opinion, sustaining the commission where the inquisition found the party an old man of eighty-five years of age, to be *of "unsound mind and mentally incapable of managing his affairs."* In *the matter of Wendell*, 1 *John. Chan. Rep.*, 600, the same chancellor directed an issue to be made and settled to try the question, whether Wendell "*be a lunatic or mentally incapable of managing his own affairs*," thus clearly indicating, by placing these terms in the alternative, that he considered the one as equivalent to the other.

In *the matter of Mason*, 1 *Barbour's Supreme Court Reports*, 436, the sufficiency of a commission came up for adjudication, in which the inquisition simply found that the party was "so far weakened and impaired in the faculties of his mind, as to be mentally incapable of the government of himself, and of the management of his goods and chattels, lands and affairs," without finding any unsoundness of mind. The subject is ably discussed by Harris, J., in which he sustains the commission and inquisition, suggesting as a reason why a stricter technicality is insisted upon in England than in this country in reference to commissions of this character is, that there the inquisition on its return may be traversed by the party returned a lunatic or of unsound mind, and hence the necessity of certainty in the form of the finding; and as the right of traverse does not here exist, there can be no necessity of any strictness of form.

This decision places the jurisprudence of this state in reference to these commissions on a proper foundation. It does away with the useless distinction between a mind that is incompetent for the transaction of business through unsoundness, and one equally incompetent through age and the decay of its faculties. Prior to this decision, no one could realize the protection he required, without being judicially branded with mental alienation, which in reference to himself and more especially his descendants, was a thing extremely painful to submit to. Now, no imputation of that kind is necessarily incurred, as the mere decay of the faculties which is so frequently incident to old age, is alone sufficient to warrant legal interference, and the extension of that protection so necessary under the circumstances of the case.

In relation to the investigation of a civil or criminal act done by a person alleged to be mentally alienated, there is no peculiar method to be observed in conducting the trial, and, therefore, nothing necessary need be said here in reference to it.

6. Its classification, its different forms, each being considered in reference to the appearances and proofs that establish it, and the legal consequences to which it is subject.

The classification which appears to be the least objectionable, and which is essentially that adopted by Dr. Guy and Dr. Ray, is the following, thrown into a tabular form:

MENTAL ALIENATION.	From defective development, or diminished activity of the faculties.	Congenital, or occurring in childhood.	Amentia,	1. Idiocy.	
				2. Imbecility.	
		Occurring subsequent to the development of the faculties.	Dementia,	1. Consequent on mania, mental shocks, or injuries of the brain.	
				2. Senile.	
	From deranged, excessive action, or undue excitement of the faculties,		Mania,	1. General.	
				2. Intellectual,	1. General.
					2. Partial.
				3. Moral,	1. General.
					2. Partial.

This method of classifying, it will be perceived, is psychological, not physiological. It is founded on the deviations from the normal state, observable in the faculties themselves, and not in the brain. This is the view which is proper, if not essential, to be taken in reference to medical jurisprudence; while, in a mere medical point of view, reference should be had to the diseased organ. One great division, it will be perceived, embraces all those cases which occur in consequence of a preternatural defect in the development, or a greatly diminished activity of the faculties. One branch of this division is congenital, embracing

Idiocy. To this, the law has given various definitions ; as, that an idiot is of non-sane memory, a nativitate, as one who from his nativity, by a perpetual infirmity, is *non compos mentis*, as one who has no understanding from his nativity. Again, that he is such a person who cannot count and number twenty, and tell who was his father or mother, nor how old he is, so that it may appear that he hath no understanding of reason what shall be for his profit, or what for his loss. Again, it is stated, if he be able to beget either son or daughter, he is no fool natural. The difficulty seems to be, that the law attempts to give too rigorous a definition, not seeming to concede that idiocy admits of degrees, which every one knows to be the fact.

Idiocy may be defined to be " that condition of mind in which the reflective, and all, or part, of the affective powers are either entirely wanting, or are manifested to the slightest possible extent." *Ray's Medical Jurisprudence of Insanity*, 69, § 37. This condition may be recognized and known,

1. By the size of head. The brain is generally much below the usual size. The deficiency is more particularly noticeable in the anterior lobes. The circumference over the obitar arch and most prominent part of the occipital bone, is put down at between eleven and one-third and fourteen and one-half inches, about equaling that of a new-born infant. The convolutions of the brain, particularly in the anterior part, are less thick, less deep, and often less numerous. Besides a great depression of the forehead, there is usually a flattening of the sides, the head being frequently grotesquely shaped. Pinel and Esquirol mention one who resembled a sheep in her inclinations, manner of action, as well as in the shape of her head. *Pritchard on Insanity*, 210. In the form of head there is observable about as much variety as in that of adults.

2. In the features there is much irregularity. The forehead low ; the eyes deeply set, small, often squinting, meaningless and

objectless; the lips thick, mouth large, open and gaping; gums spongy; teeth imperfect; limbs ill-formed, crooked and defective in their motions.

3. There is great imperfection in the senses. They are dull, or altogether wanting. The sight and hearing are often defective; the smell and taste so much so, as to make it entirely immaterial what food they subsist upon. They are short-lived, seldom living beyond the twenty-fifth year They have little, if any, use of articulate speech.

There is some variety in the power of mental manifestation by idiots. While some are sunk below the brute creation, in the scale of animal existence, there are others that display faint glimmerings of intelligence. They are the most uniform in manifesting some or all the propensities. Of these, that which seems to be the most commonly possessed is the sexual propensity. They are, also, sometimes cunning, combative and destructive. Although some of them arise to the possession of the power of perceiving, and hence of becoming acquainted with surrounding objects, their nature and qualities, yet they seem uniformly to lack the power of reflection. They are unable even to compare two ideas together. Sometimes, they are found to possess some of the moral sentiments, as self-esteem, love of approbation, religious veneration, and benevolence. Dr. Rush speaks of one who was remarkable for kindness and affection, and even spent his life in acts of benevolence, though he showed no one mark of reason. Others have showed inclination for religious worship. Some can recollect names, numbers, or historical facts, and repeat them mechanically; but have no power of combining them. Others are able to sing a few airs, and even to play on musical instruments.

Idiotism is more frequently met with in mountainous, than in plain districts of country. There is a form of it, termed cretinism, endemic in the Vallais, among the Alps of Switzerland, and in some other mountainous countries. There are three classes, viz.: cretinism, semi-cretinism, and cretinism of the third degree. In the first, life is little more than automatic. In the second, there exists the power of bestowing a slight attention upon surrounding objects; of remembering simple events, and of using language to express their common wants. In the third, there is a higher degree of intellect; a stronger power of recollecting events; a capacity to learn even reading and writing, but without any adequate conception of their purposes. Some can even learn music, drawing, painting, and machinery; while others have attempted poetry, succeeding, however, in nothing but the rhyme.

It is unnecessary to consider separately the legal consequences of idiocy: so far as they are peculiar to that state, they will be noticed hereafter.

IMBECILITY. This is defined to be "an abnormal deficiency, either in those faculties which acquaint us with the qualities and ordinary relations of things, or in those which furnish us with the moral motives that regulate our relations and conduct towards our fellow-men; and frequently attended with excessive activity of one or more of the animal propensities." *Ray's Medical Jurisprudence of Insanity*, 74, § 41.

There are two somewhat important particulars in which this state or condition is distinguishable from that which immediately preceded it. The first is, that it is not congenital, but occurs subsequent to birth; although in it the development of the moral and intellectual powers is arrested at a very early period of existence. The second is, that there is a higher degree of intelligence, and more moral power possessed by the imbecile than the idiot. In regard to the legal responsibility and liability of the former, there often occur vexed and difficult questions, but never as to the latter. It becomes, therefore, important that this state or condition of mind should be well understood. While in idiocy reason was never enthroned, and articulate speech rarely made use of, in imbecility there is possessed some intellectual and moral capacity, and some use, though a limited one, of speech.

The imbecile is generally susceptible of some degree of education. He can rise to the comprehension of a few simple ideas. He is capable, under some circumstances, of making some progress in reading, writing, arithmetic, music, and the mechanic arts. There seems, however, to be an impassible barrier in the way of their attaining that degree of knowledge and practical skill which those, in other respects, of their own station in life generally attain. In their character, both moral and intellectual, there is observable the same kind of variety as that which prevails among sound minds. While, for instance, some are fickle and changeable, others exhibit great firmness, and even obstinacy, in their pursuits. Some are capable, assisted by the occasional advice of others, of managing their property, and of attending to some of the simpler business pursuits. They are often capable of conversing ordinarily well on such every day matters as are constantly brought before their minds ; but are utterly incapable of argument, or of carrying out a well sustained conversation. They are, in general, thoughtless, improvident, timid and wayward ; incapable of strong attachment ; strangers to the higher sentiments ; are uneasy, and manifest a constant restlessness of disposition.

The German writer, Hoffbauer, has endeavored to systematize imbecility, and to define and mark out, by precise limits, the different degrees of which it is susceptible. He first distinguishes the two forms under which it is manifested. The one, he styles *imbecility* or *silliness;* the other, *dullness* or *stupidity.* The first, he supposes, arises from a defect of the *intensity*, or power of the mind to examine the data presented to it by the senses, corresponding to a defect in *reflective* power. The last flows from a defect in the *extensity*, or power by which the mind is enabled to perceive and embrace all the data furnished from without ; clearly corresponding to a defect in the *perceptive* power.

The great distinction between the two, in reference to the faculty of judgment is, that while the imbecile can, with great difficulty, arrive at any conclusions at all, the stupid can with greater facility, arrive at them, but is the most liable of the two to be erroneous. This error arises, not from judging erroneously in regard to those subjects to which his attention has been directed, but from his neglect of some considerations which ought to have formed the ground work of his judgment. The imbecile, on the contrary, finds it difficult to arrive at the most simple act of judgment. The stupid will more readily correct his mistakes, on the suggestion of the circumstance which has led to it; while the imbecile is unable to concentrate his attention sufficiently on any particular subject to enable him to do it. Weakness of intellect is displayed in both; and when the defect is well marked, it is displayed in the same manner, viz., by a propensity to talk to themselves.

The stupid is much more apt than the imbecile to imagine himself equal, if not superior, to other men in intelligence. He acts precipitately, and without reflection; while the imbecile can hardly bring himself to act at all. He has assigned to imbecility five gradations or degrees, and to stupidity three, which he has done for the purpose of facilitating the application to them of legal principles.

In the *first* degree of imbecility, there exists the inability to form a judgment respecting any new object, when the proper data are furnished, and the question not one of difficulty. When called upon to judge in reference to objects with which he is daily familiar, he is found to exercise a tolerably correct judgment. He is subject to sudden gusts of passion, which are as easily appeased as they are easily excited.

The *second* degree applies also to dementia, hereafter to be considered.

The *third* degree unfits for all matters requiring more than a mechanical mode of action. There is found in this degree a consciousness of weakness and inferiority. His memory is defective, as ideas have made no strong impression on his mind. He has a great propensity to pass rapidly from one subject to another; is irritable and suspicious in reference to the designs and intentions of those around him.

In the *fourth* degree there is a clouded state of the understanding and memory; great insensibility, but a confused idea of his weakness.

The *fifth* degree corresponds to the last stage of dementia, or the fatuity which is the result of some cerebral disease.

In stupidity, the *first* degree only incapacitates when it becomes necessary, in judging, to weigh opposing motives.

In the *second* degree he is embarrassed in any train of reasoning. His memory is slow, but his judgment may still be accurate in reference to things by which he is habitually surrounded, although he is incapable of exerting any vigor of judgmet.

In the *third* and *highest* degree, the individual is incapable of going beyond a single idea; and must completely lose that one, before he can pass to another. As judgment is always based more or less upon a comparison of ideas, it will be perceived that this degree renders the individual more incapable of exercising this faculty than the imbecile.

The classification, thus briefly alluded to, certainly has its merits, and may be useful in its practical application. It will be perceived, however, that it has reference solely to man's *intellectual nature*, affording no guide whatever to determine the extent of imbecility when it happens to occur in the *moral nature.* The French writer Georget has, to some extent, supplied this deficiency; his large experience enabling him to do that with great correctness.

He remarks that in hospitals for the insane, there is always a certain number of imbeciles who do the coarse work of the house, or serve as domestics and assistants to the regular officers. They are sufficiently intelligent to perform their duties, sweep the courts, carry burdens, move machines, execute some commissions, know the use of money, and procure various enjoyments. They have a very imperfect idea, if any, of society, laws, morality, courts and trials; and though they may have the idea of property, yet they have no conception of the consequences of theft. Although they may have been taught to refrain from injuring others, yet they are ignorant of what would be done to them if guilty of incendiarism or murder. Theft is extremely common both among imbeciles and idiots, and one great reason is, that some of them have no conception of property, nor of the distinctions of *meum* and *tuum.* When capable of experiencing the sentiment of fear, they are solely actuated by the dread of punishment, and by their own desires. Others have some notions of property, but neither a sense of morality, nor a fear of punishment, furnish motives sufficiently powerful to prevent them from stealing. The sentiment of cunning, too, may be very much developed, while the other faculties are more or less deficient.

Among the lower orders of society are many imbeciles a little more intelligent than these, and not considered as utterly devoid of understanding, who, nevertheless, have but vague and imperfect notions of social duties, and of justice. They engage in occupations that require no great extent of intellect, and even in the simplest of the mechanic arts. If they do not pass among their acquaintances for imbeciles, they are at best regarded as singular beings, with feeble understandings, and are teased and tormented in innumerable ways. Many of them, for want of some powerful restraining motive, indulge in drinking, and become lazy, drunken and dissipated, and finally fall into the hands of justice in greater numbers than is generally suspected. They steal adroitly, *and hence are considered as very intelligent;* they recommence their offences the moment they are released from confinement, *and thus are believed to be obstinately perverse;* they are violent and passionate, and the slightest motive is sufficient to plunge them into deeds of incendiarism and murder. Those who have strong sexual propensities, soon become guilty of outrages on female chastity.

I have had occasion, says Georget, to see many examples of this class in prisons, who had been judicially decided to be rational, but whose demi-imbecility was manifest enough to me. *Ray's Medical Jurisprudence of Insanity*, 82 – 3.

The character of the imbecility has generally been supposed to be sought only in the intellect. By means of this deficiency, they have been found to lack depth in thought and reasoning. They have failed to perceive the remoter relations, and higher purposes of things. They lack the power of forecast, and are beings of the present rather than the future. They seem incapable of adopting any settled plan or purpose, and are without any definite, final aim or object in their efforts.

Imbecility may as well attach to the *moral* as the *intellectual* faculties of man. The remarks of Georget just cited, bear directly upon that point.

Dr. Ray, page 84–5, cites the case of one E. S., as one in which there was the greatest difficulty in drawing the line between extreme moral depravity and insanity, and in deciding at what point an individual should cease to be considered as a responsible moral agent, and amenable to the laws. He was entirely callous to every moral principle and feeling; totally unconscious of ever having done anything wrong; and completely destitute of all sense of shame or remorse when reproved for his vices or crimes. He was utterly incorrigible through life; was dismissed several times from the asylum, and was returned again, the last time, for attempting to poison his father. There was never any symptom of diseased action of the brain, but he was obliged to be kept under restraint as a *moral lunatic.*

This was indeed a most extraordinary case; and it would seem as if he were denied by nature the possession of those moral powers, the due exercise of which, is essential to render an individual accountable.

Moral imbecility is probably of more frequent occurrence than is generally supposed. Dr. Rush, in the course of his life, was consulted in three cases of moral imbecility. In all these, he says, there is probably an original defective organization in those parts of the body which are occupied by the moral faculties of the mind.

It might, perhaps, be possible for one having the ingenuity of Hoffbauer, to attempt successfully a classification of the different degrees of moral imbecility. There are probably as many different degrees of this, as of the intellectual, and possibly as distinctly marked. There may, and often does exist, the usual intellectual power; but coupled with it, a feebleness of purpose, inaptitude for business, disregard of duty, want of probity, and sometimes strength of passion, clearly indicating that the lack is not in the intellectual, but in the moral department. The display of passion, which not unfrequently occurs, arises probably from the relatively greater strength possessed by the propensities over the higher sentiments which ordinarily control and direct them. The harmonious movement of the mind is destroyed by this relative disproportion of strength, the higher sentiments being unable, through weakness and imbecility, to influence and direct the action of the propensities, in consequence of which, they rush into irregular manifestations.

Such individuals may pass through life weak, wavering, fickle, and self-willed; frequently the prey of designing knaves, and often the inmates of jails and lunatic asylums. No attempt could be successfully made to prove them imbecile, in a court of justice, because they are possessed of intellect, and hence cannot in public estimation be imbecile. Their imbecility essentially consists in an absence of moral feeling, and a corresponding want of self-control. Sometimes a singular fancy takes possession of the mind, and exerts over it a power very similar to a delusion or hallucination in a case of intellectual mania.

This was manifested in the case of one William O. Tillard, who entertained a childish fancy for wind-mills, with an equally strong aversion to water-mills. On one occasion, he cut the calves of a child's legs through to the bone, and stated that he should have taken away its life, in order that he might be tried for his act, and removed from a place where there were no wind-mills.

The legal consequences of imbecility will be deferred until we come to treat of those of Dementia

The third form of alienation arising from defective development, or deficient power of mental manifestation, is DEMENTIA. This form of mental alienation is attended by a general enfeeblement of the moral and intellectual faculties, and is consequent on mania, mental shocks, or injuries of the brain, or sometimes it exists in old age, and is then termed senile dementia. One great point of difference between this and idiocy, and imbecility, is, that in both the latter, the faculties are imperfect, while in the former they are enfeebled. In idiocy, the effect is congenital; in imbecility, it occurs in early life, while in dementia, it supervenes in a mind which is already fully developed.

In idiocy and imbecility, the faculties are always childish, always bear upon them the stamp of an original weakness. Their action is like the stream that never rises above its fountain-head, although it always rises to it. In dementia, there still remains the foot-prints of manhood, the evidences of a power that is gone, the glimmerings of a light that is nearly extinguished. It is like the efforts of a stream to rise as high as its fountain-head, but is unable to accomplish it, from obstructions or other causes. The former are congenital, or appear in early life, while the latter never takes place until after puberty; is most apt to occur as the sequel of other diseases, especially of the more active forms of mania, or to manifest itself at the close of a long life. When once firmly seated, it may continue for years, as in the case of Dean Swift; and not unfrequently, after death, lesions of structure, or diminutions in size, are found to have taken place in the brain.

There are several points that serve to distinguish it from mania. While mania arises from a morbid excess of activity, and is characterized by great force and unusual rapidity; dementia proceeds from enfeeblement in the action of the faculties, and consequent weakness and inefficiency in their displays. The maniac discerns not the ordinary characters of objects, and relations of things, amid the mass of ideas that crowd upon his mind. The demented, through failure of strength, mistakes things, and is unable to rise to the comprehension of general truths. The maniac fails not so much in the force and logic of his conclusions, as in the incorrectness of his assumptions. In dementia, there is a paucity of ideas, a general feebleness of the perceptive and reflective powers. The memory of the maniac is defective because new ideas crowd in and mingle with the past. In dementia, there is an obliteration of impressions from insufficient power to retain them. Hurry and confusion are characteristic of mania; slowness and suspension of the thinking power, of dementia.

When the dementia arises from a sudden mental shock, the disease generally takes its hue from that circumstance, and often presents great singularity in its character. The mind, in such a case, may remain fixed for the remainder of life upon one single event.

This may be illustrated by the following case, found in *Guy's Principles of Forensic Medicine*, 296: A fisherman in Norway was about to be married to a girl who resided in a distant village, and the day previous to that appointed for the wedding, he took his boat to go to his bride's house, to spend the night in feasting. She came to meet him, accompanied by her parents, and while the two boats were returning together, a sudden squall overset the boat which carried the bride, and she and her friends perished. From that moment, the fisherman became insane, his insanity having impressed upon it a peculiar character. He was accustomed to sit from morning till night upon a small stool, which he fancied a boat, his arms and body constantly in the attitude of rowing; and if any one appeared at the door, he warned his visitor to beware how he approached, as the water was deep.

In another case, a man of great strength, of understanding, having performed important negotiation, under a promise of receiving £300,000, upon being suddenly informed that he was to have nothing, fell back insensible, into the arms of his attendants; his mind, from that time, sinking gradually into imbecility. He squandered the remains of his fortune in childish trinkets, and loved to exhibit himself dressed in rich garments, and hung with precious stones.

One of the most striking characteristics that are observable in dementia, and which goes to show that the faculties are really deranged, as well as enfeebled, is the occurrence of incoherence. This feature we have not observed either in idiocy or imbecility. This incoherence is sometimes found to prevail in every intellectual department Persons, places, times, circumstances, are jumbled together; occur disjointedly; succeeding each other without any regular order. It may be in part accounted for from a failure in the power of clearly distinguishing one thing from another. Objects dissimilar are mistaken for each other; and different times, as morning, noon, and evening, are blended together.

"Dementia," says Esquirol, "deprives men of the faculty of adequately perceiving objects, of seeing their relations, of comparing them, of preserving a complete recollection of them, whence results the impossibility of reasoning correctly. Demented persons are incapable of reasoning, because external objects make too feeble an impression on them; because the organs of transmission have lost a part of their energy; or, lastly, because the brain itself has no longer sufficient strength to receive and retain the impression which is transmitted to it; hence it necessarily results, that the sensations are feeble, obscure, incomplete. Being unable to form a true and just idea of objects, these persons cannot compare them, or exercise abstraction or association of ideas. They are not capable of a sufficiently strong attention; the organ of thought has not energy enough; it has been deprived of that vigor which is necessary for the integrity of its functions. Hence the most incongruous ideas succeed each other; independent of each other, they follow without order and connexion. Patients repeat words and entire sentences without attaching to them any precise meaning; they talk without being conscious of what they say. It seems as if unreal expressions were heard by them, in their heads, which they repeat in obedience to some involuntary or automatic impulse, the result of previous habits, or of fortuitous association with objects which strike their senses."

Senile dementia, or that which sometimes occurs to the aged, presents an instance of what is often termed chronic dementia. It does not consist alone in enfeeblement of the faculties, because if it did, we should find every old man demented. There are several degrees or stages of it. In the first occurs a loss of memory, particularly of recent events, without any serious impairment of the reasoning faculties. Early impressions and ideas long retained, now come up fresh from their long resting place. From forgetfulness of recent events, accompanied by recollections of early ones, occur many of those gaps in ideas and incoherences that, in part, constitute dementia. This defect, or loss of memory, generally marks the commencement of dementia from this cause, but not invariably. Sometimes it begins with nervous excitement, accompanied with the excitement of some faculty, function, or active power, which may act with great energy. Some become irritated by the slightest circumstance; others experience venereal desires long since extinguished; while others still, of regular, temperate, and sober habits, all at once manifest an appetite for high seasoned dishes, and intoxicating drinks. These symptoms are soon succeeded by those of dementia.

The second degree is characterized by a loss of the reasoning power. Either the reflective faculties are so completely impaired that they are unable to exercise their functions, or the other faculties, particularly the affective, are so much enfeebled, that the will does not possess sufficient strength and energy to carry out any process of reasoning. The premises are scarcely laid down, before they are forgotten. Hence the inability to draw any conclusions from them. The transaction of any business which requires a sustained attention, becomes impossible. Any slight or irrelevant idea, by disturbing the attention, draws the mind off from what it was considering, and thus destroys all attempts at continuous efforts. Some individuals in this stage recognize their friends, but seldom display signs of emotion on seeing them.

The next stage, or third degree, is termed *incomprehension*, and is attended by inability to comprehend the meaning of any principle, or proposition, however simple, that is proposed. Attention, memory, reason, all but the mere instincts, are entirely lost. Here is sometimes found a great degree of physical activity; some jumping, running, walking; others dancing, singing, and vociferating. Some are talking unmeaning jargon; others muttering half sentences, or broken expressions; while others are found sitting in silence, scarcely pronouncing a syllable for weeks, months, or even years.

The fourth and last degree, consists in a loss of instinctive action. The very animal instincts are here lost. The mode of existence is merely organic. There is neither desire or aversion, hardly a consciousness of life.

The following description of those reduced to this last stage of dementia, is taken from Dr. Prichard's Different Forms of Insanity, 238-9:

"Sometimes an individual may be seen standing erect, and immovable, with his head and neck bent almost at right angles with his trunk; his eyes fixed upon the ground, never appearing, by any movement or gesture, to be conscious of external impressions, or even of his own existence. Another sits on a rocking-chair, which she agitates to and fro, and throws her limbs into the most uncouth positions, at the same time chaunting or yelling a dissonant song, only capable of expressing a total inanity of ideas and feelings. Many sit constantly still, with their chins resting upon their breasts, their eyes and mouths half open, unconscious of hunger or thirst, and almost destitute of the feelings which belong to mere physical life; they would never rise or lie down, were they not placed in bed. A great proportion of the patients who are reduced to this degree of fatuity, are found to have lost the use of their limbs, in a greater or less degree, by partial or general paralysis."

The second class embraces that extensive range of cases in which the insane character arises from the excessive and deranged action of the faculties. We have here the active forms of mania, which in their exhibition give rise to many varieties. This in general does not consist so much in manifesting any particular extravagance of thought or feeling, as by a change of character, or a departure from ordinary habits of life. It has been well laid down by a distinguished writer, that "it is the prolonged departure, without an adequate external cause, from the state of feeling, and modes of thinking, usual to the individual when in health, that is the true feature of disorder in mind."

To judge, therefore, of the existence of mania in any alleged case, it is as important to know what have been the temper, disposition, and habits of the individual, as the present symptoms which are supposed to evidence the disease.

Mania is generally preceded by what has been termed its *incubation.* This is marked by several pretty clear indications. The individual often becomes conscious of having new and odd notions, unusual inclinations; his affections changing; he becomes sleepless, his appetite diminishes, constipation supervenes, the features alter; the gay and communicative become sad, morose, and averse to society; the economical, prodigal; the open and candid, suspicious and jealous. Business is neglected, tears and laughter succeed each other without any apparent cause or reason.

This state may continue longer or shorter, according to circumstances. In one case, it was in progress for fifteen years. When this state has continued for some time, a disappointment, a slight contradiction, or a paroxysm of anger, may give rise to the sudden explosion of mania.

In the active forms of mania, the physical indications are not to be disregarded. A febrile excitement prevails; the pulse is accelerated; the eye is wild and glassy; the sensations have become changed, being either more acute or more obtuse. They are frequently erroneous. The countenance is changed, exhibiting physical pain or mental disquietude. There is often a great insensibility to external impressions; heat, cold, hunger, and thirst, being more or less entirely disregarded. The muscular power is often inordinately developed, giving rise to the performance of acts far beyond the presumed strength of the individual. He sleeps little, and his slumbers are much disturbed.

One great difficulty seems to consist in the destruction or perversion of that influence which, in the healthy state, is mutually exercised by the faculties over, or in relation to, each other; the right exercise of which constitutes the harmonious result of all the possible exhibitions of mind. The control of mind over itself seems to be lost. In a state of sanity, the different faculties, like the different parts of a machine, all conspire together in their mutual action to one harmonious result. In mania, the same faculties may act with power and energy, but independently of each other, and thus the result be discord, derangement, and disorder. That modification of mind which constitutes a sane will is wanting, and hence the strange perversions and singular eccentricities exhibited.

It is probably beyond the power of the sane man to conceive the confusion which reigns in the mind of the madman. "A series of delusions, the offspring of some one excited passion or emotion, or one single delusion, the work of fancy, the interpreter of every sensation, the source of every thought, the mainspring of every action, holding every faculty in stern subjection, making the senses its dupes, the reason its advocate, the fancy its sport, and the will its slave; now whispering in the ear things unspoken, now painting on the eye things unseen; changing human beings at will into fiends or angels; converting every sensation into a vision; every sound into articulate speech; the unreal world within in constant conflict with the real world without; understood of no one, yet believing himself to be comprehended by all; punished for the very actions which he supposes his tyrants to have commanded; controlled in everything which he thinks it his duty to perform. There is no wish, however presumptuous—no fancy, however monstrous—no action, however absurd—no crime, however heinous, that his delusion cannot create, prompt, and justify.

That a sane man might form a conception, however faint, of the distraction of such a state as this, it would be necessary to combine into one whole, the strange confusion of a dream, and the sleeper's entire belief in its reality; the varying impressions and changing scenes of his waking hours, and the conduct, to him wholly unintelligible, of those about him." *Guy*, 328.

MANIA has two divisions:

The first embraces INTELLECTUAL MANIA, both *General* and *Partial*:

The second, MORAL MANIA, both *General* and *Partial*.

This division or classification of the active forms of Mania, will fail to be clearly understood, except by those who have accustomed themselves to look at the mind, in its sane state, as being made up of intellectual and moral powers and faculties, and of clearly discriminating the differences between them. The distinct office of the one, is to originate and elaborate all the diversified forms of thought; to perceive, conceive, imagine, remember, judge, associate, reason. That of the other, is to produce every modified form of feeling, to give birth to emotions, passions, desires, everything that impels, or in any degree feels.

The relations in which these two departments stand to each other, are in the highest degree interesting. The moral faculties, embracing as they do, all the instincts, propensities, sentiments, and affective powers, are, in themselves, perfectly blind, and absolutely require the aid of the intellect to enlighten, to guide, and to enable them to work out their various purposes.

On the other hand, the intellectual faculties derive all their motives to exertion from the moral department, without the promptings of which, they probably never would exert themselves except in the feeblest manner. In the moral or affective department is lodged the immense magazine of motives, that exert their ceaseless, and widely diversified influence, over all the stirring activities of life.

The relations of mutual dependence in which these two departments stand to each other, are very nearly analogous to those existing between the heart and brain in the animal economy. The continuance of the heart's action is necessary to enable the brain to furnish that nervous influence without which that action would cease; while, on the other hand, the brain must continue to furnish that influence, or the heart would speedily cease its pulsations.

The first we shall here take up is,

GENERAL INTELLECTUAL MANIA.

This form of mental alienation is accompanied with the utmost confusion and disorder in the action of the intellectual faculties. The exalted and perverted action of all these must produce a complete chaos of intellect.

It is extremely difficult to define in what intellectual mania essentially consists. In regard to *consciousness*, which is a mode of action common to all the faculties, intellectual and moral, the maniac undoubtedly possesses it. Not only is he conscious of his state, but also very frequently of the legal relations in which it places him. A madman had contrived to give a piece of iron the shape of a dagger, and had firmly fixed into it a handle. On its being taken away from him he became excessively abusive, and, in a fit of fury, exclaimed to the keeper, "*I'll murder you yet: I am a madman and they cannot hang me for it.*" The firing of York Minster by Martin, gave rise to a discussion in relation to his probable fate in a neighboring mad-house. In the midst of it one of the inmates exclaimed, "he (Martin) will not be hanged, of course he will escape." "For what reason," asked several. "*They cannot hang him*," replied the lunatic, "*because he is mad, he is one of ourselves.*"

The *sensation* of the maniac is often influenced by some diseased affection. The female mentioned by Esquirol, who fancied she had a living animal in her stomach, was found to have been laboring under a cancer of that viscus; and the woman who believed that the pope and his cardinals were holding a council in her belly, was discovered to have labored under a chronic inflammation of the peritoneum. Independent of disease, the senses do not always seem to furnish correct reports to the sensorium. In the autobiography of the maniac he says: "My senses were all mocked at and deceived. In reading, my eyes saw words on the paper which, when I looked again, were not. The forms of those around me, and their features, changed even as I looked on them: I heard the voices of invisible agents, and notes so divine, so pure, so holy, that they alone, perhaps, might recompense me for many sufferings. My sense of feeling was not the same; my smell, my taste, gone or confounded."

The *perception* of the maniac may be correct, although morbid impressions may influence the judgments based upon them. For instance, an insane female entertained the firm conviction that her husband was dead, and when he came to visit her she insisted upon it that it was the devil in his shape. The perception of what constituted her husband was correct, but her judgment based upon it was erroneous.

The *memory*, so far as the simple recollection is concerned, does not appear to be affected in this form of mania. The maniac undoubtedly exercises memory, but he remembers his own halucinations or delusions, as much or more clearly than he does real events.

The *judgment* is the most generally perverted. The lady who insisted that a tooth which a dentist had removed, had slipped from his fingers and stuck in her throat, and that she could not swallow a morsel, while she eat and drank heartily all the time, was wrong both in her premises and conclusion; and Bellingham, who imagined that the government had been culpably negligent of his private interests, and, therefore, he proceede to take the life of a man whom he believed to be perfectly innocent, in order that he might have an opportunity of bringing his affairs before the country, erred in almost every act of his judgment. The mere judgments formed, however, are often correct in themselves, although they may be exercised in reference to some erroneous impression, or utterly unfounded notion, which may constitute the main feature of the alienation. The man who imagines his legs to be made of glass, entertains a very erroneous impression, but in acting upon that imagination, he judges very correctly when he avoids a blow with a stick, because on the supposition that they were glass, they might, in that manner, easily be broken. So also the man who supposes himself a plant, and, under that impression, stationed himself in his garden to be watered, judged correctly admitting the truth of his supposition.

The *reasoning power* of the maniac is by no means abrogated, but the misfortune is, that it is exercised in reference to his delusions or hallucinations, and not to facts as they really exist. The power of reasoning is sometimes very acute. An instance is given of a jesuit, named Sgambari, who believed himself a cardinal, and claimed to be addressed by the title of eminence. A friend was anxious to convince him of his error, and obtained, on one occasion, a patient hearing. When he had finished the madman replied, "Either you consider me insane or rational; on the latter supposition you do me injustice by your remonstrances; on the former, I hardly know which is most mad, I for believing myself a cardinal, or you, for thinking to cure a madman by such reasonings."

The *associations* of the maniac are wild, strange, and unnatural. This mode of activity of the faculties, is usually extremely disordered. The power of association remains, but its exercise is strangely perverted. It is obedient to the prevailing delusion or hallucination. The maniac, for instance, who wrote his autobiography, associated the inmates of the asylum and his keepers with supernatural beings. There was a maniac there whom his spirit called the Lord Jehovah, supremely omnipotent, the trinity in unity; and one of the keepers was supposed by him to be the

Savior of mankind. At other times these same persons assumed other shapes, and according to the state of his mind, were either fiends or angels. This delusion could give to any object any shape it pleased. *Guy's Principles of Forensic Medicine*, 324.

The feature which the most distinctly characterises intellectual mania, both general and partial, is the entertainment of delusion or hallucination. This is of two kinds. In the one, the maniac believes in the reality of things that never existed, and acts in conformity with his belief. In the other, he seizes upon things that are not wholly unfounded, and carries them to erroneous and extravagant lengths. The strange antics of the maniac, and his violent conduct, are often traceable to the delusions that tyrannize over the movements of his mind.

As intellectual mania arises from the perverted action of the faculties that form ideas, and moral mania from those that furnish feelings, emotions, motives, and passions, we should naturally expect to find the first more characterised by the *conversation*, and the last, by the *conduct*, of the individual. This accordingly will be found to be the fact, and it affords one of the best means of discriminating between the two.

The maniac almost uniformly entertains the conviction of his own sanity. He trusts in the truthfulness of his own feelings and ideas, and no force of argument can, in the slightest degree, shake his confidence in his opinions. The state of highest maniacal excitement has been ably described by Pinel. "The patient," he says, "sometimes keeps his head elevated, and his looks fixed on high; he speaks in a low voice, or utters cries and vociferations, without any apparent motive. He walks to and fro, and sometimes arrests his steps, as if excited by the sentiment of admiration, or wrapt up in profound reverie. Some insane persons display wild excesses of merriment, with immoderate bursts of laughter. Sometimes also, as if nature delighted in contrasts, gloom and taciturnity prevail, with involuntary showers of tears, or the anguish of deep sorrow, with all the external signs of acute mental suffering. In certain cases a sudden reddening of the eyes, and excessive loquacity, give presage of a speedy explosion of violent madness, and the urgent necessity of a strict seclusion.

One lunatic, after long intervals of calmness, spoke, at first, with volubility; he uttered frequent shouts of laughter, and then shed a torrent of tears; experience had taught the necessity of shutting him up immediately, for his paroxysms were, at such times, of the greatest violence."

When intellectual mania prevails alone, there is no perversion of the moral faculties. But it is often, perhaps, more generally than otherwise, found complicated with moral mania. To this fact is to be attributed the peevishness and unevenness of temper, the sensitiveness and utter disregard of the proprieties of life, and the great and apparently radical change that sometimes takes place in the affections, that is oftentimes observable in cases of intellectual mania.

Partial Intellectual Mania. This was formerly known by the term *melancholia*, but more recently has been styled *monomania.* This last mentioned term is not quite as distinctive as it should be, as it is equally applicable to any partial derangement of the moral powers.

The first appearance, and most simple form of this species of derangement, consists in the entertaining of some strange and fantastic notion, against which the verdict of common sense would be most unqualifiedly rendered. Thus, in the case mentioned by Sir George Makenzie, the individual seemed a discreet person, and could converse appropriately on every subject until the moon was mentioned; and, upon hearing that named, he would fall instantly a-staring, and into great extravagancies, believing himself to be secretary to that satellite. *Guy*, 305. Many and singular have been these notions. Some have imagined they had a living animal within them, and that they were gradually dying from other animals preying upon different parts of their bodies. Others, that they are converted into animals of other species, such as geese, a cock, a dog, a cat, a hare, a cow, and the like. In such cases, they adopt the noises and gestures of the animals into which they suppose themselves to be transformed. *Rush on Diseases of the Mind*, 78–9, 80. A prince of the house of Bourbon supposed himself a plant. Some have supposed themselves transformed into glass. One believes that by discharging the contents of his bladder, he shall drown the world; another, that he is dead, stretching himself out, and assuming the semblance of his final sleep. One remarkable instance is the Reverend Simon Brown, who for many years before his death, entertained the belief that he had lost his rational soul. He supposed that God had caused it gradually to perish, and that he had only remaining the animal life, which he enjoyed in common with the brutes. A lunatic in Wartsburgh supposed there was a person concealed within his belly, with whom he held frequent communication, and that too, although he was, at the very time, struck with the absurdity of the idea.

The delusive idea in which the derangement consists, may be sometimes traced to some bodily sensation or disease. Thus, a woman insisted that she was pregnant with the devil, and in her womb, after death, was found a mass of hydatids. Another imagined that a regiment of soldiers lay concealed in her belly, and that she could feel them struggling and fighting with each other. After death, the intestines were found agglutinated together, in consequence of chronic peritonitis. But this is not always the cause, otherwise it would not admit of the kind of cure that may sometimes be effected, viz., an impression made upon the mind. This was illustrated in the person who supposed himself cured of a serpent in his bowels by a pretended surgical operation, but suddenly took the idea that it had left its ova behind, from which a brood of young ones would be hatched. This delusion was quickly banished by the dexterous reply of the physician, that this was impossible, because the snake was a male. *Guy's Principles of Forensic Medicine*, 306.

The delusion not unfrequently bears a near relation to the former habits of business, or to the usual occupation, of the monomaniac. The son of an attorney who was frequently employed in criminal prosecutions, fancied himself suspected of some horrible crime, for which a process had been issued against him, and whenever the door of his room was opened, he supposed the officers of justice were coming to apprehend him.

The monomaniac, unlike the maniac, is often conscious of his own derangement, and frequently succeeds, for a long period of time, in concealing it. He thus furnishes evidence of the conviction on his part, that the common sense of mankind believes him insane on one particular topic, or train of ideas, at the same time that he clings to that topic or train with a strong and unyielding tenacity.

It must not be supposed that every affection of an intellectual faculty amounts to mental alienation. Many of the perceptive faculties may be disordered in their functions. Some of them may be even entirely obliterated, and yet the mind retain the general integrity of its powers. This, however, cannot probably happen where those faculties that discern the relations of things are disordered in their functions. There are instances where the faculty of language has been impaired, and sometimes totally destroyed, without at all appearing to injure the general action of mind, or to render it less sane in its operations. In one remarkable instance, a gentleman of sixty totally lost the memory of places, so that he could not recollect his own house; although his intellect was sound in reference to all other things.

The simplest form of this species of alienation is where the insane delusion is confined to a single topic, and this will, sometimes continue unchanged for a number of years. At other times, the features of the derangement vary, and different delusions or hallucinations prevail, either successively or together. The original tendency to become monomaniac on one subject, appears to render it less difficult to become so on any other, or a number of others.

Where the alienation relates to a single topic or idea, the intellect may be sane on all other subjects. There is, however, much difficulty in marking out the precise barriers of insane delusion. The particular topic or idea in which it consists, may be so blended with others, as to pervert or derange them. It may also happen that many cases of so called monomania, are examples of general mania, characterized by the immoderate activity of some one faculty.

Of Moral Mania. Hitherto, the attention has only been directed to the exaltation and perverted action of those faculties that constitute the intellectual part of man's nature. It is perfectly obvious, however, that the *affective* or *moral* powers are equally as essential as the intellectual, in constituting a complete human mind. Nor can the organs of these faculties claim an exemption from disease; nor the faculties themselves from perversion and derangement. Hence, another form of active mania, which has been termed *moral mania.*

This was never recognized as a distinct form of mental alienation, until the time of Pinel. He was the first to observe, about the commencement of the present century, that where there was no lesion of the understanding, no delusion or hallucination of intellect, there might exist a kind of instinctive or abstract fury, which could be referable only to the affective powers. It is now very universally admitted by the most approved writers on mental alienation. It is defined to consist in a morbid perversion of the natural feelings, affections, inclinations, temper, habits and moral dispositions, without any notable lesion of the intellect or knowing and reasoning faculties, and particularly without any maniacal hallucination. *Guy's Principles of Forensic Medicine*, 306. Moral mania, like intellectual, is divided into *general* and *partial.*

General Moral Mania. This form of mania consists in a general exaltation, perversion, or derangement of function, of all the affective or moral powers. Those who have observed and written upon this form of mental alienation, unite in describing those who labor under it as persons of singular, wayward, and eccentric character. Their antipathies are violent, and suddenly taken; their suspicions unjust and severe, and their propensities strong and eagerly indulged. They are generally proud, conceited, ostentatious, easily excited, and obstinate in the maintaining of absurd opinions.

It will be often found, on enquiry, that there is in the family an hereditary tendency to insanity; and, possibly, that the individual himself has been afflicted with it in an earlier period of his life.

A strict enquiry must be made in relation to his former habits, disposition, and modes of feeling and action. This will, probably, result in the discovery of one of two things. Either a marked change will be found to have occurred, which will be likely to date from the period when he sustained some reverse of fortune, or experienced the loss of some near and dear relative; or the alteration will be found to have been gradual and imperceptible, consisting in an exaltation or increase of peculiarities which were always natural or habitual. There is, also, another tolerably extensive class of cases, in which the change has been consequent upon some shock which the bodily constitution has undergone; and this has been either a disorder affecting the head, an attack of paralysis, a fit of epilepsy, or some fever or inflammatory disorder.

The change, however brought about, is always found in the temper, disposition, habits, and moral qualities of the individual; and is uncomplicated with any delusion or other evidence of derangement of the intellectual faculties. It is properly described by Hoffbauer as being "a state in which the reason has lost its empire over the passions, and the actions by which they are manifested, to such a degree, that the individual can neither repress the former nor abstain from the latter. It does not follow, that he may not be in possession of his senses, and even his usual intelligence; since, in order to resist the impulses of the passions, it is not sufficient that the reason should impart its counsels, we must have the necessary power to obey them. The maniac may judge correctly of his actions, without being in a condition to repress his passions, and to abstain from the acts of violence to which they impel him."

To an acute and accurate observer, a marked contrast will be here presented between the intellectual and moral faculties. In the former, there is no diminished force or perverted action. The power of reasoning not only remains unimpaired, but generally displays a greater strength than natural, in accounting for those eccentricities, and waywardness of character, and peculiar displays of temper and passion, that mark the course of the moral maniac. He can paint, with unabated force, the beauties of virtue, and the excellency of truth, justice, mercy, and every other moral quality; while his conduct exhibits only the extreme of folly, and is in direct opposition to all moral propriety.

This general derangement of the moral powers is very likely to pass into and affect the intellectual. Indeed, so frequently does this occur, that it has actually been described by Georget and others as belonging to the initiatory stage or *incubation* of madness. It is, however, well settled, that either form of the disease may exist independent of the other, and that either one of them may be made the subject of distinct medico-legal investigation.

Whenever this form of mania becomes the subject of legal investigation, great difficulties are always presented. The popular mind is accustomed to recognize insanity only in delusion, and to couple it with raving, and lesions of intellect, never observable in pure moral mania. Hence the extreme difficulty in proving this form of it, and the different kinds of testimony offered by the witnesses. One has seen the individual in connection with his business, and observed him regular and methodical in all his business arrangements, and to all appearance perfectly regular in the use of his intellect. Another has had some opportunity of noticing some strange and unaccountable eccentricity of conduct, totally irreconcilable with the possession and exercise of a sane mind. The facts, to which these two would testify, would apparently be wholly at variance with each other, and yet when the real form of the malady is known, would be entirely consistent.

One general remark here will be found to be universally applicable. As we found the *conversation* to afford the means of indicating the existence of intellectual mania, so the *conduct* is equally as clear a means of indicating that of moral mania. This follows from the fact, that intellectual mania, resulting as it does from a derangement of the faculties that form ideas, would be recognized more readily in the derangement of those ideas of which the conversation would be evidence; while the conduct being under the prompting and guidance of the affective or moral powers, would naturally be regarded as affording clear indications of the state and condition of those powers.

Many cases, illustrating this peculiar form of mania, are to be found in writers on insanity, particularly in the works of Ray and Prichard. The following, given simply as an illustration, is one quoted from Prichard by Ray. *Ray's Medical Jurisprudence of Insanity*, 172–3.

"J. K., a farmer, several of whose relatives had been the subjects of mental derangement, was a man of sober and domestic habits, and frugal and steady in his conduct, until about his forty-fifth year, when his disposition appeared to have become suddenly changed, in a manner which excited the surprise of his friends and neighbors, and occasioned grief and vexation in his family. He became wild, excitable, thoughtless, full of schemes and absurd projects. He would set out and make long journeys into distant parts of the country to purchase cattle and farming stock, of which he had no means of disposing; he bought a number of carriages, hired an expensive house ready furnished, which had been inhabited by a person much above his rank, and was unsuitable to his condition; he was irascible and impetuous, quarrelled with his neighbors, and committed an assault upon the clergyman of the parish, for which he was indicted and bound to take his trial. At length, his wife became convinced that he was mad, and made application for his confinement in a lunatic asylum, which was consequently effected The medical practitioners who examined him were convinced of his insanity, by comparing his late wild habits and unaccountable conduct with the former tenor of his life, taking into consideration the tendency to disease which was known to prevail in his family. The change in his character alone had produced a full conviction of his madness in his friends and relatives. When questioned as to the motives which had induced him to some of his late proceedings, he gave clear and distinct replies, and assigned with great ingenuity some plausible reason for almost every part of his conduct."

In some instances, old men in the decline of life, who have led long and virtuous lives, become afflicted with this form of mania. In such case, the whole moral character becomes changed, the pious becoming impious; the economical, profuse; the liberal, penurious; the sober, drunken. Impulses that had long been effete become suddenly excited, and a strong tendency to the formation of vicious habits is manifested. It would seem as if the lower propensities, or some of them, had been gathering fresh vigor through a long life, in order to make their peculiar and offensive displays near the close of it; or, (what, perhaps, is the most probable,) the guards placed over them in the intellect and high moral feelings are relaxed through weakness, and hence leave unrestrained the play of propensity and passion.

Partial Moral Mania consists in the deranged or perverted action of one, or a few, of the affective or moral powers and faculties. The effect of it is to place the individual under the dominion of some one vice, or ruling idea, which exercises a sway, perfectly tyrannical, over the entire man and his actions. Every moral power or faculty is liable to be perverted or deranged in its manifestation; but those which are the most prominent, and the most frequently exhibited in the affairs and conduct of life, are the most liable to deranged action. Hence, the propensities are, in general, more frequently found deranged than the sentiments, and some of the sentiments much more frequently than others. We will notice a few of the affective or moral sentiments that are liable to derangement.

The sexual propensity is liable to deranged action, arising from a morbid or diseased condition of its organ. An individual of either sex, under the influence of it, is constantly haunted by a crowd of voluptuous images, and hurried away into the perpetration of acts of the grossest licentiousness. It is known by the term *erotic mania.*

An instance is mentioned of a very intelligent lady, who was tormented, from early life, with the most inordinate desires. Her good education alone, for some time, saved her from the rash indulgences to which this propensity so violently urged her. Arrived at maturity, she abandoned herself to the gratification of her desires, but this only increased their intensity. Frequently, she saw herself on the verge of madness; and, in despair, she left her house and the city, and took refuge with her mother, who resided in the country, where the absence of objects to excite desire, the greater severity of manners, and the culture of a garden, prevented the explosion of the disease. After having changed her residence for that of a large city, she was, after a while, threatened with a relapse, and again she took refuge with her mother. On her return to Paris, she complained like a woman in perfect despair. "Everywhere," she exclaimed, "I see nothing but the most lascivious images; the demon of lust unremittedly pursues me, at the table, and even in my sleep. I am an object of disgust to myself, and feel that I can no longer escape either madness or death." *Ray's Med. Juris. of Insanity*, 188.

The case of *Lord Audley* reported in 3 *Howel's State Trials*, 401, furnishes a remarkable instance of the perverted action of this propensity. He was tried, found guilty and executed, fo committing a rape upon his own wife, and for the crime against nature. The testimony on this trial developed, to an extraordinary degree, the action of this propensity. It appeared as the constant theme of thought, and in all the possible varieties of sexual intercourse, he appeared to take an intense and peculiar interest.

A number of instances of this kind of mania are cited in *Ray*, 186, &c. A very remarkable fact is stated in *Morrison's Physiognomy of Mental Diseases*, 76, going to show the extreme tenacity with which insane ideas adhere to the mind. During the first attack of the Asiatic cholera in the Lunatic Asylum at Hanwell, in September and October, 1832, when only females were the subjects of it, several patients, laboring under erotic mania, exhibited lasciviousness in their words and actions, in the highest degree, long after the pulse at the wrist had ceased to be perceptible, and the skin and the tongue had become quite cold, indeed, until a very short time before they expired.

To show the irresistable character of the promptings of this propensity, and the entire deprivation of moral liberty to which it leads, reference may be had to *Graham's Lecture*, 201, in which he gives extracts from a letter written by the chaplain of one of our State prisons, in reference to the practice of self-pollution among the prisoners. He speaks of one prisoner in particular, who, when he first knew him, had a full and ruddy cheek, which, in a little time, became pale and sunken, and who confessed that he had become a slave to that vice, and feared it was doing him harm; for, said he, "*I seem to have no power over myself.* I awake from my sleep and find myself in the act. Three times a night, for weeks in succession, I have yielded to it, and frequently *without being voluntary in the thing*." The deranged action of this propensity sometimes leads to a more general form of mania.

Cleptomania, or *propensity to steal*, is another instance of partial moral mania. This form of it was observed by Dr. Rush. He remarked "that there are persons who are moral to the highest degree as to certain duties, but who, nevertheless, live under the influence of some one vice. In one instance, a woman was exemplary in her obedience to every command of the moral law but one,—she could not refrain from stealing. What made this vice more remarkable was, that she was in easy circumstances, and not addicted to extravagance in anything. Such was the propensity to this vice, that when she could lay her hands on nothing more valuable, she would often, at the table of a friend, fill her pockets secretly with bread. She both confessed and lamented her crime." *Rush's Medical Inquiries and Observations*, 1.

Many remarkable instances of the morbid action of this propensity may be found in writers on insanity, as Prichard, Ray, and Guy. It sometimes exhibits itself as a leading feature, if not sole characteristic, of moral mania; as, in the lunatic who would only eat what he had stolen, and his keeper made it a constant practice to conceal his food, that he might find and get possession of it furtively before eating it.

It is sometimes found coupled with abnormal conditions of brain; as, in one case, where it was ill organized and ricketty, and another, where it was preternaturally small.

It is often found complicated with general mania. Instances are given by Pinel of persons who, in their lucid intervals, were considered models of probity, but who could not refrain from stealing and cheating during the paroxysm.

It has been observed to follow diseases or injuries of the brain. A young man, of correct habits, received a severe blow on the temple, for which he was trepanned, and afterwards manifested an invincible propensity to steal. *Ray*, 183. The late Dr. Smith, of New-Haven, observed a similar effect to follow an attack of typhus fever.

It is sometimes followed by general mania, as in the case that fell under the observation of Foderè.

It has, in some cases, been found connected with certain states and conditions of the animal economy. There are instances of women who, when pregnant, were violently impelled to steal, though perfectly upright at all other times.

The recorded instances are extremely numerous, showing the derangement of this propensity; but the most extraordinary one is of recent occurrence, in the case of *Charles Sprague*, reported in 6 *Vol. of American Journal of Insanity*, *page* 254. He was the son of a respectable clergyman. His paternal grandmother, great-grandmother, and some other relatives on the same side, had been insane. When young, and only about seven years of age, he experienced several severe injuries of the head, and would, at times, complain of the headache, and, at such times, was observed to have an unnatural prominence and dullness or glassiness of his eyes, which continued after the headache had ceased. Simultaneously, or closely succeeding the first occurrence of these facts, it was found that the *shoes* of the female members of the family, occasionally the pair, although more generally one of them, were missing; and, after some time, would be found thoroughly soaked in water, twisted up like a rope, and hid away in some secret part of the house. After a time, it was traced to Charles. This strange habit continued from that time forward, with occasional intermissions of perhaps three or four months, until in August, 1849, he overtook a young lady in the street, in Brooklyn, threw her down, snatched a shoe from one of her feet, and ran off with it, for which he was indicted and tried for highway robbery. His own account of the transaction to his father was, that he did not know much, if anything, about it, except what the witnesses told him; that he did not deny it; that he thinks he was going along in the street, and caught sight of a shoe, and it flashed into his mind like lightning that he wanted it, and he dove for it; that he did not know what he wanted with it, nor what he ever wanted with one; that he did not know how he got the girl down; *that the whole affair was a kind of haze before his mind*, that his first distinct recollection of what took place that morning was of being near the printing office, after the affair had happened, about half a mile beyond where it occurred. In every other respect, his moral character was shown to have been perfectly faultless, and his habits all correct. He was respectably married, and had one child. Of the hundreds of instances in which he had exercised this singular propensity, he had been seen to take a shoe but twice. He never took any but *women's shoes*. It seems clearly to have been a case of irresponsibility.

Another insane manifestation occasionally witnessed is that of *lying*, in persons otherwise of irreproachable morals and good education. This seems to result from an inability to tell the truth, rather than from any other cause. It must be admitted, however, that this vice may be owing to circumstances purely moral, such as faulty education, evil examples, and a lax morality, and hence that there may be great difficulty in discriminating between that which proceeds from moral and physical causes. If it proceed from the physical, and be a case of partial moral mania, there will most probably have been a change observable in the individual. There may also be present some physical indications of mental alienation. That it does occasionally proceed from those causes appears pretty evident from the fact, that it is liable to degenerate into unequivocal mania, and is also quite a common feature of this disease.

Another faculty in the moral constitution of man which is extremely liable to derangement is *cautiousness*, or that which gives birth to the sentiment of fear. The influence of this sentiment, in the sane state, is all-pervading. When, therefore, it becomes deranged, we may reasonably expect to witness great, if not frightful results. The derangement here is probably more frequently functional than physical in its causes. There is hardly a single event or movement in all life's vicissitudes, that does not make some appeal to the sentiment of fear. The force and power of the appeal must depend upon the natural inherent strength of the sentiment.

The direction taken by the sentiment, in its manifestation, will be governed by the other faculties with which it may happen to be associated. When united with adhesiveness, it fears the loss of friends or of friendships; when with acquisitiveness, that of wealth or worldly possessions; when with love of approbation, it fears the miseries of a blasted name; and when with the religious feelings, the terrible and afflictive visitations of the Supreme Being.

The melancholic is described as generally thin and emaciated, the hair straight and black, the skin cold and clammy, the look fixed and motionless. He seldom sleeps much, and when occasional slumber visits his eyes, a thousand ugly phantoms present themselves to his disturbed imagination, and terrify him into wakefulness.

So entirely is the mind absorbed in one single idea, that common sensation, to a great extent, seems to have abandoned the bodily organs. They are unsusceptible to impressions, and the intellectual faculties, in extreme cases, suspend the exercise of their functions.

The mental misery in that state termed despair is truly apalling. A clergyman who passed four years and an half in that state in describing his own feelings says, that "he felt the bodily pains and mental anguish of the damned; that he slumbered only, but never slept soundly during the long period of four and an half years; that he lost his appetites and passions, so as to desire and relish nothing, and to love and hate no one; that his feet were constantly cold and the upper part of his body warm; that he lost all sense of years, months, weeks, days and nights, and even of morning and evening, and that in this respect time was to him no more. During the whole period of his misery, he kept his hands in constant motion towards his head and thighs, and ceased not constantly to cry out, wretched man that I am! I am damned! oh! I am damned everlastingly!" *Rush on the Mind*, 93.

But the horrors of deranged cautiousness sometimes end not with despair. There are symptoms even beyond this terrible picture. Even the deep seated principle of the love of life is occasionally extinguished, and the ardent wish to die originates from the severity of mental suffering. In such cases life is sometimes destroyed by the frenzied energy to which itself gives birth, and suicide is actually perpetrated in order to escape from the horrors of existence.

But there is a state of mind even beyond this, and which is still more distressing. It is where both the desire and the fear of death operate alternately upon the same mind. Dr. Rush says he has seen this state. It was in a lady who wished to be relieved from the horror of her thoughts by the complete loss of her reason. This is beautifully expressed by Shakespeare in his King Lear:

> "Better I were distract;
> So should my thoughts be severed from my griefs,
> And woes, *by wrong imaginations, lose*
> *The knowledge of themselves.*"

So almost infinite are the sources of misery in the human mind. Who shall say that its sources of enjoyment are not correspondingly extensive?

Hope is perhaps as strong a sentiment as *fear*, and as influential in the conduct of life. A derangement of this faculty is sometimes, although not near so frequently met with, in which the torch of the malady may be said to be lit up at the fires of a joyful heart. Those affected with this species of derangement are always happy; no cloud rests on their horizon, no apprehension dampens their enjoyment. Their eye sees nothing but beauty, their ear hears nothing but music, their tongue talks nothing but rapture. Theirs is a course of light, and whether in their own mansion or a mad-house their present is full of joy, and their future of hope. The mind riots amid its own ruins, and invests even them with the hue of the rainbow.

There are several other sentiments such as benevolence, veneration, self-esteem, &c., that are occasionally met with in a deranged state, but they are of such unfrequent occurrence, and so seldom become subjects of medico-legal investigation, that the particular consideration of them here is unnecessary.

The most interesting, the most fatally destructive, the most frequently met with in courts of justice, and the most difficult of comprehension, is a perversion or derangement of the *destructive propensity*. There are two forms of this, viz:

1. *Pyromania* or destruction by fire. Incendiarism.

On the European continent considerable attention has been devoted to this particular form of monomania, and several cases have there occurred in illustration of it. It has generally been found either excited by the ordinary causes of insanity, or by that constitutional disturbance which often accompanies the menstrual periods; or it occurs about the age of puberty, and seems to be connected with retarded evolution of the sexual organs. *Ray*, 190. One of the first cases noticed was that of Maria Franc, a married woman of intemperate habits, who, from the moment of witnessing a burning building, felt a desire to fire houses which, upon drinking, became an irresistible impulse. This impulse was the only reason she could give. In other respects her mind was sound. Within five years she fired twelve houses, and was arrested and executed on the thirteenth attempt.

In a village near Cologne, a girl of a quiet, inoffensive disposition, and of exemplary character, made seven different attempts at incendiarism. When enquired of as to her motives, she shed tears, confessing that at certain periods she felt her reason forsake her, and that then she was irresistibly impelled to the commission of a deed which, when done, she bitterly repented. She was acquitted of all criminal intentions. *Guy's Principles of Forensic Medicine*, 312.

In one instance given, the derangement was connected with imbecility.

Sometimes this insane propensity has been found coupled with delusions, as in the instance reported by Platner, as quoted by *Prichard on the Different Forms of Insanity*, 144–5. This was a country girl, who twice attempted to set fire to a house. She said she was incited by a voice which continually commanded her to burn, and then destroy herself. The first burning she witnessed with calmness and delight; the second, she gave an alarm, and attempted to hang herself. She had been subjected to a spasmodic disorder, which degenerated into fits resembling epilepsy.

Another instance is the case of Jonathan Martin, who set fire to the cathedral church at York, and when accused of having stolen the golden fringe and other ornaments of the choir, declared that he had no design to steal anything, but that an angel from God, having commanded him to set fire to the church, he wished to furnish himself with proof that he alone had committed the act, and that no other person might bear the punishment. *Prichard*, 145 – 6 – 7.

As this deranged propensity is frequently connected with, or proceeds from, the retarded evolution of the sexual organs, the age of the individual should be noticed, to determine whether it be about the age of puberty. So also the symptoms of irregular developement, and of marked critical movements, such as rapid increase of stature, small sexual development, uncommon lassitude and sense of weight and pain in the limbs, glandular swellings, and cutaneous eruptions, should all be carefully observed. Irregularity in the menstrual discharge may exert a strong influence on the mental condition. Symptoms of disturbance in the circulating system, and also in the nervous, may indicate an arrest or delay in the development of the sexual functions. *Ray*, 195.

2. The second form of derangement of the destructive propensity, is found where life is the object of it. This has two subdivisions:

1. Self-destruction: Suicide, commonly called *suicidal monomania.* This, for legal purposes, is not so necessary to be investigated as it once was. Still, it may occasionally be necessary to settle the question whether the act of suicide really furnish evidence of mental alienation or not. With some, it is regarded as always the effect of insanity; with others, as never the effect of it. The ancients seem very generally to have arrogated to themselves the right to destroy their own lives, whenever, in their judgment, it should be proper. Pliny was accustomed to term it the greatest privilege the gods had left in the power of men amid the calamities of human life. Suicide was of very frequent occurrence in Rome; and in China at the present time, where a mandarin falls into disgrace, he most commonly has recourse to self-destruction.

This is no doubt frequently the result of moral depravity, as, for instance, where men of cultivated intellects and refined passions, put a period to their existence when they have derived from it all they can reasonably expect of sensual gratification.

But in a very great number of cases, and Esquirol thinks in all, the suicidal act is the deed of a monomaniac, and results from a pathological change in the brain, or some part of it. In some cases, a morbid cautiousness may inspire a greater fear of the miseries of life than the evils of death.

There have also occurred cases, where insane impulse has acted in this direction, and the individual has been led, in a manner unaccountable to himself, to attempt his own self-destruction. There are many circumstances going to show that it frequently originates from a deranged mind. One is, that although considerable forethought and ingenuity may have been evinced in preparing the means, yet when the attempt fails, in many cases, the individual, after his recovery, has either no recollection, or a very faint one, of the fact itself, receiving it upon the testimony of others.

Another fact going to show its connection with insanity, is its hereditary character, and as Falret asserts, it is more hereditary than any other form of insanity. There are certainly many cases on record, showing it hereditary.

Another feature which it possesses in common with other forms of mental alienation, is the occasional exacerbations that are witnessed, when its symptoms, for a time, disappear, the clouds of melancholy seeming to vanish, and all appearances indicating a return to life and its enjoyments. Again the propensity will reappear, and generally in the end accomplish its purpose.

Another fact tending to show its connection with mental derangement, is that it sometimes prevails epidemically, and is propagated by sympathy. A soldier at the Hotel de Invalids hung himself on a post. His example was followed in a short time by twelve others, who hung themselves on the same post. On cutting down the post, the epidemic ceased. In 1793, no less than 1300 are said to have destroyed themselves in Versailles.

In the French army, a grenadier killed himself. His example was followed by another, and it was feared it was assuming an epidemic character. Napoleon, then First Consul, issued the following order:

"The grenadier Groblire has committed suicide, from a disappointment in love. He was in other respects a worthy man. This is the second event of the kind that has happened in this corps within a month. The First Consul directs that it shall be notified in the order of the day, that a soldier ought to know how to overcome the grief and melancholy of his passions; that there is as much true courage in bearing mental afflictions manfully, as in remaining unmoved under the fire of a battery. To abandon one's self to grief without resisting, and to kill one's self in order to escape from it, is like abandoning the field of battle before being conquered!"

This proved sufficient to check effectually the growing epidemic. 2 *American Journal of Insanity*, 93.

One additional fact may be mentioned, tending to identify this with insanity or other nervous diseases; and that is, that in many instances, the brain or abdominal viscera have been found, by examination after death, to have suffered organic lesions, the latter having affected the mind by sympathetic irritation. This has been found the fact where no indications of disease preceded the fatal act, or anything that would create a suspicion that any such act was intended.

2. The second form is homicide, (the destruction of others,) generally termed *homicidal mania.* This, at the present day, is a subject of immense interest throughout the civilized world. Here, in a most peculiar manner, and with most appaling results, is shown the amazing strength of insane impulse; which by a power and energy resistless as the fiat of God, impels the wretched being to destroy life, without a motive to actuate, or an end to be attained, or object to be accomplished. Individuals in the full possession of their usual powers of intellect, whose social and moral organization, to all appearance, remain unaffected, have imbrued their hands in the blood of the innocent, frequently in that of their own wives and children, simply because *they felt that they must destroy.* The records of insanity are full of such instances, and I am sorry to be compelled to add, that those of

our criminal courts of justice have too frequently shown, that those who could destroy without motive, and without a sane will, could, as their reward, be murdered under the forms of law.

The discovery of this form of partial moral mania, dates back only to the commencement of the present century. It was first distinctly described by Pinel. It is now very universally admitted by writers on Medical Jurisprudence. *Ray*, 198.

It is remarked by Esquirol, that there are two forms of homicidal insanity. In one of these, the monomaniac is actuated by avowed motives, which are more or less irrational, and is generally looked upon as mad. In the other, there are no motives acknowledged or discernible; the individual being impelled by a blind, irresistible impulse. The first, being complicated with delusions or hallucinations, is only a form of partial intellectual mania. It is the last only that, in strictness, constitutes homicidal mania; although both these appear occasionally to be combined with each other.

The recorded instances in which this form of derangement has displayed itself, are very numerous, as may be seen by reference to the works of Ray and Prichard on Insanity. All that can be introduced here, is simply sufficient to illustrate, to show the application of the principle.

A carrier on the route between Untre Cobingen and Hussenhofen met a woman, whom he struck several times with his hatchet, and left her lying in a ditch by the road-side. Next he encountered a lad thirteen years old, whose head he split open. Shortly after, he split the skull of a man thirty years old, and scattered his brains in the road; and after hacking the body, left his hatchet and carriage, and proceeded unarmed towards Hussenhofen. He next met two Jews on the road, whom he attacked, but who, after a short struggle, escaped him. Near Hussenhofen, he assaulted a peasant, whose cries brought several persons to his aid, by whom the maniac was seized and carried to Gemunde. They afterwards led him to the bodies of his victims, when he observed, "It was not I, but my bad spirit, that has committed these murders." *Ray*, 200.

William Brown, in 1812, strangled a child whom he accidentally met one morning, while walking in the country. He took up the body and laid it on some steps, and then went and told what he had done, requesting to be taken into custody. He said he had never seen the child before; had no malice against it, and could assign no motive for the dreadful act. He bore an exemplary character, and had never been suspected of being insane. He was convicted and executed.

In some cases of homicidal mania, the presence of some physical or moral disorder may be detected; in others, not. Its existence, however, is very possible, in cases where it has not been detected. Sometimes homicidal desires of the intensest kind will flit through the mind of the perfectly sane, and while in the enjoyment of usual health.

This form of mania has been known to occur in women, and seems connected with those constitutional changes produced by parturition, menstruation, and lactation. The victim selected is generally a young child. Several instances of this kind are given by Dr. Ray.

There are several cases in which the exciting cause is of a moral nature, and the unhappy subject feels under an imperious necessity of destroying life. Instances have not unfrequently occurred, in which were manifested deliberation and design, the act having been perpetrated under the most appalling circumstances, with the utmost calmness and composure.

The case of Henriette Cornier, which occurred in France, in 1825, is justly regarded as a leading case under this head. She was a female servant, aged twenty-seven years, of a mild and lively disposition, full of gaiety, and fond of children. In June, a change was observed in her character. She became silent, melancholy, and sank into a kind of stupor. No cause of her dejection could be obtained from her. In September, she attempted to commit suicide, but was prevented. In October, she entered into the service of Madame Fournier, but was still melancholy and desponding. No cause could be ascertained. She would talk only of her misfortune in losing her parents at an early age, and of having received bad treatment from her guardian. On the fourth of November, her mistress went out to walk, having previously told her to prepare dinner at the usual hour, and to go to a neighboring shop, kept by dame Belon, to buy some cheese. She had frequently been there, and manifested great fondness of Belon's little girl, about nineteen months old. On this occasion, displaying unusual fondness for it, she persuaded its mother to let her take it out with her to walk. She hastened back with the child to her mistress' house, and laying it across her own bed, severed its head from its body with a large kitchen knife. She subsequently declared she felt no particular emotion either of pleasure or of pain. She stated that shortly after, the sight of the horrible spectacle brought her to herself, and she experienced some emotions of fear, but they were of short duration. At the end of two hours, dame Belon came and enquired for her child, from the bottom of the stair-case. "Your child is dead," said Henriette. The mother went up stairs, and pushed forward into the chamber; and at that moment, Cornier snatched up the head of the murdered child, and threw it into the street, from an open window. An alarm was raised; the officers of justice, with others, came and found Henriette sitting on a chair near the body of the child, gazing at it, with the bloody knife by her, her hands and clothes covered with blood. She did not attempt to escape, nor did she deny the crime. She confessed all the circumstances, even her premeditated design, and the perfidy of her caresses. She displayed no emotion of remorse or grief, replying with indifference, "I intended to kill the child." She said she had no particular reason for it; that *the idea had taken possession of her mind, and that she was destined to do it.* When asked why she threw the head into the street, she answered that it was for the purpose of attracting public attention, so that people might come up to her chamber, and see that she alone was guilty.

This case, attended with these circumstances, presented great difficulty. The jury returned a very singular verdict, viz.: That she was guilty of "committing homicide voluntarily, but not with premeditation;" and she was sentenced to hard labor for life. *Ray*, 215, *et seq.*

This case excited a great sensation in France; and, what is very remarkable, Esquirol states that six cases occurred within his own knowledge, immediately after it, showing the strange tendency to imitate acts of this atrocious character.

Sometimes, as formerly stated, some motive is alleged, which, although well founded, is altogether inadequate. This is illustrated in the case of Rabello, a Portuguese. He was employed as a mechanic in Litchfield county. His conduct had appeared singular, but inoffensive. One day, a little son of his employer, only twelve years old, accidentally stepped upon his toes; Rabello was exceedingly angry, and threatened the boy's life. The next day he appeared sullen, refused his food, and looked wild and malicious. The following morning, he went to the barnyard with the boy, seized an axe, and killed him on the spot, mangling him in the most shocking manner. He went deliberately away from the house, but was soon overtaken by those in pursuit. He acknowledged that he had killed the boy, and gave as a reason, that he had stepped on his toes.

It was found from the evidence produced at his trial, that this was an offence considered most heinous, and not to be forgiven. To test the reality of this, one of the physicians, while counting his pulse, stepped, apparently by accident, upon his toes. The pulse rose immediately forty strokes in a minute; his countenance flushed up, and he appeared instantly in a rage.

He was acquitted on the ground of insanity, and after the trial, it was ascertained that he had been previously deranged. *Ray*, 220-21.

In some cases, religious fanaticism, and excitement of the religious sentiments, have roused into activity the murderous propensity. Pinel gives the instance of a vine-dresser, who thought himself commissioned to procure the eternal salvation of his family by killing them, or by the baptism of blood, as he called it. He killed two of his children, when he was arrested and confined. Fourteen years after, he conceived the project of offering up an expiatory sacrifice, by killing all who might come within his reach, and actually wounded the keeper, and cut the throats of two other lunatics, before he could be arrested.

Sometimes the insane delusion is that he shall come to want; and under the influence of that, he kills his family, and generally himself. As in the case of James Purington, who, under that apprehension, killed his wife and five of his children. See *Ray*, 222–3.

In some cases, the desire to commit an atrocious act was accompanied by a clear conception of its enormity, and a horror at the idea of its perpetration. The desire has been resisted and overcome, or a warning given to the person to escape.

A young man, aged twenty-one years, was of a sombre disposition, lost his father at the age of fourteen, and never exhibited much affection towards his mother. At eighteen, his dejection increased; he shunned society, yet worked industriously, displaying no other sign of insanity than declaring that he felt a strong inclination to commit murder; and there were moments when he felt that he could feel pleasure in killing his sister or mother. When the horrible nature of these suggestions were set before him, and their consequences, he exclaimed, "I am no longer master of myself." On several occasions, after having embraced his mother, his face became red, his eyes sparkled, and he cried out, "Mother, take care of yourself, I am forced to kill you!"

On one occasion, he met a Swiss soldier in the street, who was a stranger to him; he seized his sword, and made a sudden effort to take it from him and stab him. On another occasion, he found his mother in the cellar, and attempted to kill her with a bottle. For six months he was agitated with this impulse, slept little, complained of his head, and kept in solitude; was insensible to the grief of his family, but exhibited in his discourse no sign of mental aberration. He was subsequently perfectly restored.

A young lady experienced homicidal desires, for which she could assign no motive. She was rational on every subject, and whenever she felt the approach of this dreadful propensity, she shed tears, entreated to have the straight-waistcoat put on, and to be carefully guarded, till the paroxysm, which sometimes lasted several days, had passed. *Ray*, 199.

The numerous cases that have occurred, will, it is thought, justify the following general deductions, most of which are laid down substantially, by *Dr. Ray*, 224 – 5 :

1. In general, the criminal act has been preceded by some physical disturbance, originating in the head, digestive system or uterus ; or by an irritable, gloomy, dejected or melancholy state :

2. The act will also generally be succeeded by the same, or more marked indications of disturbance of function, and having a more direct reference to derangement of mind, either wholly or partially :

3. The destructive impulse is strongly excited by the sight and proximity of murderous weapons ; by favorable opportunities ; by contradiction, disgust, or some trivial or imaginary circumstance :

4. The victims selected are either unknown or indifferent, or among his most loved and cherished objects, frequently children and offspring ;

5. Some deplore the propensity by which they are controlled, and beg to be restrained ; others conceal it ; others openly avow it, declare their murderous designs, and form schemes for their execution :

6. Some, after gratifying the destructive propensity, confess the act, and give themselves up to the authorities ; a few fly, and persist in denying the act :

7. Some interpose insanity in defence of their conduct, or assert their ignorance of the act ; while others deny that they labored under any such condition.

DELIRIUM. The organs of mind are not here primarily affected They only sympathize with the general system, the state of high febrile excitement being propagated through the entire organization, and affecting the brain in common with other organs. It rarely occurs in long protracted chronic diseases, such as cancer, dropsy, or pulmonary consumption ; but except these, few diseases terminate in death without the subjects of them being more or less delirious, particularly near their close.

Delirium may occur suddenly, but more commonly comes on gradually, preceded by pain or throbbing in the head, heat, and flushing of the cheeks. The patient at first talks during sleep, and is momentarily forgetful on waking. During the intervening period, his senses are collected. Gradually the delirium becomes more intense. The eyes are open, presenting a dull, listless look. He becomes regardless of persons and things around him, talking to himself in a low, muttering tone. His mind seems entirely occupied with past scenes and events, which occur without order or apparent connection, and to which the tongue gives utterance in broken and disjointed sentences. As the delirium becomes more deep and intense, the voice grows more indistinct; the fingers pick at the bed-clothes, and there is a total incapacity of being roused to any further effort of attention. Sometimes the excitement is much more intense, and a higher degree of nervous symptoms. *Ray*, 296 – 7 ; *Guy*, 267.

Many curious instances have occurred, in which, under the influence of delirium, words and ideas that had long lain dormant in the mind, and had become utterly forgotten, are recalled in all their original freshness.

A patient in St. Thomas' Hospital, after receiving an injury of the head, and becoming delirious, was observed to speak a language that nobody could understand, but which at length was ascertained to be Welch. He was originally a Welshman, but had been from his native country about thirty years, during which he had entirely forgotten his native tongue, and acquired the English language. *Ray*, 297. *Dr. Rush*, see *Diseases of the Mind*, 282–3., mentions the fact that the old Swedes of Philadelphia, when on their death-beds, would always pray in their native tongue, although they had not spoken it for fifty or sixty years, and had probably forgotten it before they were sick. He quotes from Dr. Muhlenburgh the further observation that people generally pray, in their last hours, in their native language; a fact which he had noticed in innumerable cases among his German hearers, although hardly one word of German was spoken by them in common life, and in days of health. A physician who, in early life, had renounced the Roman Catholic faith, in the delirium of a fever which preceded his death, prayed only in the forms of that church.

These facts would seem to furnish some reason for entertaining the opinion, that nothing acquired by the mind is ever entirely lost, but that all its buried recollections may be rendered available under some of its states or conditions.

Delirium occasionally disappears a few days or hours before death, leaving the mind much enfeebled by disease, but in possession of its natural soundness.

Delirium more closely resembles mania than any other mental state. Still, to the close observer, there is little danger of their being confounded with each other. Mania is an independent disease, while delirium is only a symptom of another disease, and as such, is influenced or varied, as the disease diminishes or increases in severity. The first seldom occurs until after puberty; the second attacks all ages. In the first, persons and things are clearly recognized; in the second, little attention is paid to things without. In the first, the patient reasons, although incorrectly; in the second, there is an entire abolition of the reasoning power. In the first, the muscular power is not diminished, and quite frequently is very much increased; in the second, there is invariably great muscular debility. In the first, sensation, both general and special, is most frequently unimpaired; in the second, all these avenues to the understanding seem entirely closed. In the first, many of the bodily functions remain undisturbed; in the second, every function suffers. *Ray*, 298 – 9.

Somnambulism. There is an extensive class of mental manifestations hitherto unnoticed, that present many curious and interesting phenomena. In it are included spectral illusions, dreaming, and somnambulism. The two first are unnecessary to be considered in connection with Medical Jurisprudence, and the third may perhaps be looked upon as more curious than useful.

The power which the mental faculties occasionally manifest, of using, without being conscious of it, the voluntary muscles; and even of possessing an intimate knowledge of the objects of perception around them, while the senses, or channels of sensation, through which they are ordinarily admitted, are locked in slumbers as profound, for the time, as are those of the grave; are problems in existence, which no effort of human ingenuity has ever been found entirely capable of solving.

The peculiarity that seems to pervade this class of cases, is, that a part or all the mental faculties are preternaturally active; that they are in a state of exaltation, and hence morbid in their displays; and that the senses, or that which is equivalent to them, are in fact so modified as to adapt themselves to the state or condition of mind at the time prevailing. Hence the ear sometimes remains insensible to the loudest sound, and at others will catch the slightest whisper. Such attention or inattention depends upon whether the sound is in harmony with what happens at the time to be passing within the mind.

The somnambulist's senses of taste and smell are, at times, acute and accurate; while at others, they are quite the reverse. Negretti, the Italian servant, did not distinguish between seasoned cabbage and salad. He drank water instead of wine, which he had called for; and snuffed ground coffee instead of snuff. The occasional greater acuteness of the senses during this state, may be owing to the fact, that the faculties having concentrated their energies upon one object, are endowed with more and greater strength of perception.

Another fact going to show that the mind is the all-powerful agent, is, that external objects are often transformed by it into the instruments which it then happens to have occasion for. Thus the somnambulist described by Hoffman, dreaming that he was about going on a journey, strided across the sill of an open window, kicking with his heels, and exerting his voice, as if he supposed himself riding on his horse.

In some cases, vision, or some power analogous to it, seems to be exercised. Castelli was one night found translating Italian into French, and was observed to look for the words in a dictionary. His light having gone out, he found himself in the dark, groped about for a candle, and went into the kitchen to light it. He would also get up and go into his master's shop, and weigh out medicines for supposed customers.

Another, a priest, would arise from his bed and compose sermons, reading over each page when finished, and erasing and correcting with the utmost accuracy. *Ray*, 390-91. Another case seems to demonstrate the possession of the power of vision to an almost incredible extent. Jane Ridder was able, in a dark room, to make out the date of coins, the figures of which were nearly obliterated, and to read the motto of a seal, which others had been unable to decipher by the light of a lamp. With her eyes covered by several folds of handkerchief, she could still read and write as if nothing intervened, and play at backgammon understandingly. *Ray*, 391.

The senses of hearing and taste are also much modified. But little attention is paid to what is taking place around them, unless it happen to be connected with what is passing in their own minds.

There is little doubt but that somnambulism is connected with a morbid condition of the system involving in it the organs of the mental faculties. Like mental alienation it is hereditary, showing its physical origin. As in the active forms of mania, there is sometimes a most remarkable exaltation of some of the faculties. Jane Ridder would sing correctly, although she had never learned music, nor been known to sing when awake. She would also play at backgammon with considerable skill, though she had never learned the game in the waking state. She also evinced a power of imitation, of which she showed no trace while awake. *Ray*, 395.

There are some very striking instances in which the sentiments and propensities of the somnambulist are exhibited in a remarkable degree of activity. A Carthusian monk, although very correct and exemplary in his waking state, yet in his sleeping, was occasionally a thief, a robber, and a plunderer of the dead. A pious clergyman would in his sleep-walking steal, and even plunder his own church. A somnambulist in Maine was strongly disposed to commit suicide. He succeeded one night in escaping from the house, but an outcry being heard from a neighboring pasture, he was found suspended from the limb of a high tree. The rope was fortunately attached to his feet instead of his neck, so that very little injury was experienced, *Ray*, 395.

The psychological, as well as physiological facts, developed by the somnambulist, are of an exceedingly curious character. Some or all the mental faculties appear, during the paroxysm, to possess an inherent power of acting independent of external influences; and they also, unconsciously to themselves in a different state, can bend in subserviency to their own purposes the material organization with which they are connected; and all this, unless we admit two separate and responsible states of being, is without will, motive, or responsibility.

One of the interesting forms in this class of cases is what is termed ECSTASIS, or CATALEPTIC SOMNAMBULISM, in which this exaltation of the faculties is coupled with a cataleptic affection. *Ecstasis* is defined to be a state in which certain ideas so completely absorb the mind, that the external sensations are suspended, the voluntary movements arrested, and even the vital action retarded. In the paroxysms of cataleptic somnambulism, the patient appears in a deep quiet sleep, conversing with fluency and propriety, and evincing very often extraordinary activity of intellect. What is the most remarkable fact connected with it is, that after the paroxysm has passed off, no recollection remains of what was either said, done, thought, or felt, during its continuance; but on its again recurring, the recollection of all that took place in previous paroxysms revives, but the memory of those events that transpired intermediate the paroxysms is lost. The individual thus has, in a manner, a two-fold existence; the one being independent of the other; and the idea of a double consciousness has been suggested, with the view of attempting to explain the strange phenomena presented. We cannot probably expect, in the present state of our knowledge, a perfectly satisfactory explanation.

DRUNKENNESS. This, including its sequel *delirium tremens*, is a state or condition of mind necessary to be examined on account of its legal consequences. The first effect of a psychological character, noticed after the drinking of alcoholic mixtures, is an increase in the power and activity of the mental faculties. The impulses furnished by the propensities are stronger; the emotions contributed by the sentiments more vivid; and the ideas originating from the intellect more brilliant. The inevitable consequence of this is a rapid expenditure of sensorial power, soon inducing a state of exhaustion.

The faculties seem at first about equally affected by the stimulus. The balance, after a time, becomes lost. The high reflecting powers of intellect, together with the higher moral sentiments, become weak, imperfect, vacillating and finally temporarily paralytic. The exhibitions continue to partake more and more strongly of the peculiar promptings of the propensities, and to become constantly more decidedly animal. This effect is owing not only to an increase in their strength, but also to the diminished power and influence ordinarily exerted over them by the higher sentiments and powers of intellect.

The effect of habitual and repeated inebriation, is to render the organs of mind continually less and less liable to be influenced by their ordinary, accustomed stimuli. That physical law which graduates organic action in accordance with the ordinary stimuli adapted to elicit it, is violated; and the consequences of such violation can no more be avoided, than the author of that law can cease to be immutable.

There is a striking uniformity between the peculiar effects of a single fit of intoxication, and the final results of a course and habit of inebriation, fully carried out. In both, the torpor and exhaustion are first manifested in the reflective faculties and the high moral powers. The intellectual grasp is impaired, and the power of originating moral distinctions, and of appreciating the nature and efficacy of moral forces, is very greatly diminished. The propensities in both cases, released from the restraint of that higher nature, become more energetic in their action. They seem actually improved and invigorated, as if deriving strength and energy by feeding on the corruptions of that moral death which has thrown its oblivious pall over the intellect and higher sentiments—like the worm, increasing from the consumption of its coffined banquet.

An habitual indulgence in alcoholic drinks, by keeping up a constant irritation of the cerebral organs, results in permanently deranging their structure. The fibres become hardened, and serous effusions sometimes take place. Those pathological changes are effected, which, in turn, react upon the habit, rendering its bonds absolutely indissoluble. Hence the inebriate whose case is mentioned by Macnish, replied to the remonstrances of his friend, who painted the distresses of his family, the loss of his business and character, and the ruin of his health; "my good friend, your remarks are just, they are indeed too true; but *I can no longer resist temptation.* If a bottle of brandy stood at one hand, and the pit of hell yawned at the other, and I were convinced that I would be pushed in as sure as I took one glass, *I could not refrain.* You are very kind. I ought to be grateful for so many kind, good friends, but you may spare yourselves the trouble of trying to reform me; the thing is out of the question." And the thing probably was out of the question. The habit had so vitiated the organs of mind, and the depraved organs had so reacted on the habit, that each had become bound to the other, by bonds that death only could sunder.

Drunkenness is often periodical. Individuals are guilty of excesses at particular times, who are perfectly sober during the intermediate periods. Esquirol has noticed this periodicity in drunkenness, and whether continued or periodical, he treats it under the term *dipsomania*, attributing it to the influence of pathological changes in the brain. He, therefore, does not consider its unhappy victims as morally responsible. The craving of the stomach for strong drink he thinks imperious and irresistible. He insists that the unfortunate victims obey an impulse which they have not the power of resisting; that they are true monomaniacs; and that if carefully observed, we should find in them all the characteristic features of partial madness.

It has been remarked that it sometimes occurs in women at the turn of life, as a result of the important physiological changes which, at that period, take place in the female constitution. *Ray*, 425.

There is a singular disease, to which the continued use of intoxicating drinks very frequently leads, called *delirium tremens* or *mania a potu.* The delirium that here supervenes is not at first constant, but becomes so after a few days; and constitutes the most prominent feature of the disease. This is not the delirium of a fever, because no sufficient febrile symptoms are present. It is distinguished from mania by the previous history of the individual, and the peculiar symptoms of the disorder. The delirium bears a strong resemblance to dreaming. It seems as if dreams were mistaken for realities.

The patient is suspicious, mistrustful, and subject to constant fears, alarms, and apprehensions. One of the most common hallucinations is, that he is constantly seeing devils, snakes, vermin, and all manner of offensive and unclean things around him; and peopling every nook and corner of his apartment with these loathsome objects. The extreme terror which these delusions often inspire, produces in the countenance an unutterable expression of anguish, and, in the hope of escaping from his fancied tormentors, the wretched patient often endeavors to cut his own throat, or resort to some other mode of self-destruction. Although generally tractable, and not inclined to be mischievous, yet, under the influence of these terrible apprehensions, he sometimes murders his wife or attendant, whom his disordered imagination identifies with his enemies. After perpetrating an act of this kind, he generally gives some illusive reason for his conduct, rejoicing in his success, and expressing regret at not having done it before. The tremor from which this form of delirium is named, is rarely altogether absent, and where present, is very characteristic.

LEGAL APPLICATIONS; or the LEGAL CONSEQUENCES WHICH ATTACH TO THE DIFFERENT FORMS OF MENTAL ALIENATION.

Having examined the different forms of mental alienation, or unsoundness of mind, and endeavored so to define and describe each form, as to lead to its clear identification whenever it occurs, the next object is to make the application to them of the legal principles which human wisdom has devised, and human prudence adopted, with the view both of saving the insane from the consequences of their own actions, at the same time that a sufficient protection is thrown over the community in which they reside. It should here be remarked, however, that the different forms under which mental alienation has been considered, have been adopted from mere convenience, and as presenting a means of more thoroughly understanding, and clearly explaining, the extremely tangled web of mental alienation. The law seeks only to know whether there exists, in any given case, unsoundness of mind. Whether that unsoundness proceeds from preternatural defect, indicated by idiocy, imbecility, or dementia, or from exalted and perverted action of the faculties, as in the active forms of mania, is to it not of the slightest consequence. Whether the unsoundness exists, and is sufficient to absolve from liability, are all it seeks to know. Such, however, is now the extent of knowledge within the reach of the medical jurist on this subject, that neither courts nor juries could have much confidence in his testimony, unless he could designate the forms under which mental alienation presents itself, and describe that then under consideration.

The law, it is true, as we have already seen, does recognize two forms, viz., idiocy and lunacy; intending, undoubtedly, to include under them the two great divisions of mental alienation, the one originating from preternatural defect, and the other from excess and perverted action of the intellectual and moral powers. Under the term *unsoundness of mind*, may be included all that cannot come in under idiocy and lunacy.

We have already noticed the principle upon which exemption from liability proceeds; the division recognized by the law; the occasions in which it interferes; and the general means or methods by which its interferences are effected. Before proceeding to notice the legal consequences which attach to the different forms of unsoundness of mind, it may be proper to direct the attention to a few general considerations.

The presumption of law is always prima facie in favor of sanity. Whenever, therefore, exemption from liability is claimed, on the ground of mental unsoundness, it devolves on the party claiming to allege and prove it. That allegation and proof being furnished, the legal presumption changes, and the mental unsoundness is presumed to continue, until the allegation and proof of a complete restoration, or a lucid interval. This latter is so frequently made the subject of discussion in courts of law and equity, that some attention should be devoted to it.

LUCID INTERVALS once formed much more prominent subjects of inquiry than they do at present. Even the term lunacy originated from a supposed connexion of mania, and its intermissions, with the changes of the moon. At the present time, the medical profession do not appear to attach so much importance to lucid intervals. Mr. Haslam declares that, "as a constant observer of this disease, for more than twenty-five years, he cannot affirm that the lunatics, with whom he had daily intercourse, have manifested alternations of insanity and reason." On the other hand, Esquirol, who also states facts from personal observation, fully recognizes the existence of insanity with lucid intervals, and identifies it with what others have termed "recurrent," and with what he terms "intermittent insanity." The mania, says Foderè, which is accompanied by fury, is very often periodical. Georget speaks of lucid intervals as returns to reason; but says, that patients in this state have some disturbance of their ideas, and weakness of mind, impairing their power of attention. *Dr. Combe* in his *Observations on Mental Derangement*, 2 *Vol.*, insists that the patient, however calm and rational he may appear, is, nevertheless not in as perfect possession of his senses as if he had never been ill. That although in ordinary excitement, and under ordinary circumstances, his perceptions may be accurate, and his judgment sound, yet a degree of irritability of brain still remains behind, which renders him unable to withstand any unusual emotion, any sudden provocation, or any unexpected and pressing emergency. This will, probably, express the general views of the medical profession in reference to lucid intervals.

The next and most important inquiry is what the law regards as a lucid interval. D'Aguesceau, in his pleading in the case of the Abbe d'Orleans, see *Evans' Pothier on Obligations*, *Appendix*, 579, says, "It must not be a superficial tranquility, a shadow of repose; but, on the contrary, a profound tranquility, a real repose. It must be, not a mere ray of reason, which only makes its absence more apparent when it is gone—not a flash of lightning, which pierces through the darkness only to render it more gloomy and dismal—not a glimmering which joins the night to the day—but a perfect light, a lively and continued lustre, a full and entire day, interposed between the two separate nights, of the fury which precedes and follows it. And, to use another image, it is not a deceitful and faithless stillness which follows or forebodes a storm, but a sure and stedfast tranquility for a time, a real calm, a perfect serenity; in fine, without looking for so many metaphors to represent our idea, it must be, not a mere diminution, a remission of the complaint, but a kind of temporary cure, an intermission so clearly marked, as in every respect to resemble the restoration of health."

These same views substantially seem to have been early adopted by the Court of Chancery in England. In *The Attorney-General* vs. *Parnthier*, 3 *Brown's ch. Cases*, 234, Lord Thurlow says, "By a perfect interval, I do not mean a cooler moment, an abatement of pain or violence, or of a higher state of torture—a mind relieved from excessive pressure; but an interval in which the mind, having thrown off the disease, had recovered its general habit."

In regard to the continuance of a lucid interval, D. Aguesceau further remarks, that "as it is impossible to judge in a moment of the quality of an interval, it is requisite that there should be a sufficient length of time for giving a perfect assurance of the temporary re-establishment of reason, which it is not possible to define in general, and which depends upon the different kinds of fury; but, it is certain, there must be a time, and a considerable time, that an action may be sensible in appearance, without the author of it being sensible in fact; but an interval cannot be perfect, unless you can conclude from it that the person in whom it appears is in a state of sanity; the action is only a rapid and momentary effect, the interval continues and supports itself; the action only marks a single fact, the interval is a state composed of a succession of actions. Its duration must be sufficiently long to admit a judgment of its reality. Nothing can be more distinguishable than a reasonable action and an interval. The one is an act, the other a state; the act of reason may subsist with the habit of madness; and, if it were not so, a state of folly could never be proved."

So, also, in the case before referred to, Lord Thurlow says, "that the evidence in support of a lucid interval, after derangement at any period has been established, should be as strong and demonstrative of such fact as where the object of the proof is to establish derangement. The evidence, in such a case, applying to stated intervals, ought to go to the state and habit of the person, and not to the accidental interview of an individual, or to the degree of self-possession in any particular act."

The courts of law and equity, in their subsequent decisions, have not essentially modified the rule as above laid down. In the English Ecclesiastical Courts, the rule has, in some instances, been very much relaxed, the disposition having been always strongly manifested to sustain the validity of last wills and testaments, when their provisions were reasonable. Perhaps, the strongest case is that of *Cartwright* vs. *Cartwright*, 1 *Phillimore's Rep.*, 90, in which a will was contested on the ground of insanity in the testatrix. The woman, both before and subsequent to the making the will, was afflicted with many of the worst symptoms of mania. For some time previous to its date, she was very importunate for the use of pen, ink, and paper, which were withheld from her by the direction of her physician. He at length consented, in order to quiet and pacify her. They were brought to her, and her hands, which had been constantly tied, were unloosed, and she sat down to a bureau to write. She wrote on several pieces of paper in succession, which she tore up and threw into the grate, walking up and down the room in a wild and ferocious manner, and muttering to herself. After spending some time in this manner, she finally wrote a will that suited her, and which occupied but a few lines. Under these circumstances, the court, Sir William Wynne, decided that she had a lucid interval at the time of making the will, which, for that reason, was established as valid. The grounds were, that the will made a natural and consistent distribution of her property; that it "was a rational act, rationally done," and hence the inference was, that her mind was visited with a lucid interval at the moment of making it. The court distinctly took the ground that the act itself afforded the strongest and best proof of the existence of the interval.

This principle has not been affirmed by subsequent decisions, although a strong tendency has ever existed to infer capacity from the nature and quality of the act done. In *White* vs. *Driver*, 1 *Phil.*, 84, a greater amount of proof was required to establish the fact of a lucid interval; and in that of *Groom and Thomas* vs. *Thomas and Thomas*, 2 *Hagg's Eccl. Rep.*, 433, the court, Sir John Nicholl, laid down the doctrine, that where there is not actual recovery, and a return to the management of himself and his concerns, by the unfortunate individual, the proof of a lucid interval is extremely difficult.

When the sanity is confessedly of a doubtful character, the agent may be inferred rational from the character, broadly taken, of his act. *Scruby and Finch* vs. *Fordham*, 1 *Addam's Eccl. Report*, 74.

While the law restores to the insane his civil responsibility during a lucid interval, it is much more cautious in restoring his responsibility for crimes. For this caution there are sound physiological reasons. Crimes are usually the results of momentary excitement, produced by sudden provocations. These provocations re-produce that pathological condition of the brain called *irritation*, the essential cause of the mental derangement. The temporary cure, therefore, that constituted the lucid interval, is put an end to, and the diseased condition of the brain is again resumed.

In the earlier periods of the law, a distinction was made between acts done by those of unsound mind *in pais*, as it is termed, and those done in courts of record. The latter, such as fines and recoveries, and declarations of their uses, were not voidable, because it was presumed that had they been under these disabilities, the judges would not have admitted them to make these acknowledgments. There was, besides, another reason, viz.: The law could allow no averment against the verity of a record; a record, as Lord Coke observes, importing such absolute verity, that it is always proved by the production of itself.

The acts done *in pais* could be avoided by heirs and personal representatives, but not by the individual himself. The reason assigned was, that " no man should be allowed to disable himself, for the insecurity that may arise in contracts from counterfeit madness and folly. Besides, if the excuse were real, it would be repugnant that the party should know or remember what he did in such a state."

This doctrine is now entirely exploded. In 3 *Day's Rep.*, 90, it was held that a man might show he was *non compos mentis* in avoidance of his deed. Judge Story, in 1 *Story's Equity Jurisprudence*, § 225, remarks, in reference to the early doctrine, that " it is matter of wonder and humiliation, how so absurd and mischievous a maxim could have found its way into any system of jurisprudence professing to act on civilized beings."

The case of *Bagster and Others* vs. *Portsmouth*, 7 *Dowling and Ryland*, 614, establishes the principle, that in the absence of all fraud and imposition, and where the goods supplied appear to be suitable to the condition and degree of the party receiving them, and which, in his ordinary habits of life, he would be likely to require, the fact of his being of unsound mind, and legally incapable of making his own contracts, would not deprive a tradesman of his right of suing in a court of law for the value of the goods for which he had given him credit. The great difficulty is referred to of being able to discriminate, at first view, between a person of sound and of unsound mind.

It may be as well to examine, in this connexion, the progress of the law in relation to the criminal responsibility of the insane. There are here two anomalies that strike us in the outset. The one is that a different rule or principle of responsibility should be established between civil and criminal acts; that the same degree of incapacity should be exonerated from the civil, and yet held responsible for the criminal conduct. This seems to have been successfully claimed and maintained by the Attorney-General of England, in the case of Bellingham, in 1812, and had previously to that been conceded by Lord Erskine, on the trial of Hadfield, in 1800. The concession of Lord Erskine went even beyond what the law requires, as he admitted that a civil act might be avoided, even although it were not connected with the delusion which constituted the insanity. But to establish the doctrine, that a capacity so diminished or deranged from disease of the organ, as is sufficient to exempt from liability for civil acts, should, nevertheless, be held responsible for those that are criminal, appears strange and unaccountable. Criminal acts, which are usually consequent upon undue excitement, are much more likely to spring from minds just on the verge of derangement, than civil acts, which seem more to follow each other in the ordinary natural course of things. Why, then, should an individual be divested of his property, and absolved from all his civil liabilities incurred while in that state, and yet be held to the utmost degree of accountability for all aggressions upon liberty or life? There appears to be no reason, physiological or psychological, for making this distinction.

Another anomaly is in the character of the evidence adduced to prove capacity or incapacity. When the capacity for the performance of a civil act is testing, the nature and character of the act itself is insisted upon as furnishing some proof either of the capacity or incapacity of the person performing it. "A rational act, rationally done," raises, at least, a presumption, that its source may be rational. So, also, an irrational act, irrationally done, affords a like presumption of incapacity. Does the same rule obtain in acts that are criminal? A man imbrues his hands in the blood of his own family, or, as in the case of Freeman, hereafter alluded to, destroys the lives of an entire family that had done him no injury. Instead of its being regarded as an insane act, the individual is more frequently looked upon as a monster of iniquity, who can hardly find a parallel in the records of crime. It cannot, perhaps, be said that the law itself, in direct terms, affixes to these acts these different characters, as it no where lays down distinctly such a principle. The objection is, that causes are generally conducted, and permitted to go to juries, upon these principles.

The principles that serve as a guide in determining the capacity or incapacity in relation to civil responsibilities, are either totally inapplicable, or stop far short of exonerating from criminal acts. It becomes then a matter of anxious inquiry what are the tests of capacity or incapacity, and what are the principles that lie at the foundation of irresponsibility for crimes. These have furnished more or less of a puzzle to courts, from the days of Lord Hale to the present time.

The earliest attempt worthy of notice to define these tests and principles was made by Lord Hale. In his *Pleas of the Crown*, 30, he says, "There is a partial insanity and a total insanity. The former is either in respect to things *quoad hoc vel illud insanize.* Some persons that have a competent use of reason, in respect of some subjects, are yet under a peculiar *dementia* in respect of some particular discourses, subjects, or applications; or else it is partial, in respect of degrees; and this is the condition of very many, especially melancholy persons, who, for the most part, discover their defect in excessive fears and griefs, and yet are not wholly destitute of the use of reason; and this partial insanity seems not to excuse them in the committing of any offence for its matter capital, for, doubtless, most persons that are felons of themselves and others, are under a degree of partial insanity, when they commit these offences. It is very difficult to define the invisible line that divides perfect and partial insanity; but it must rest upon circumstances, duly to be weighed and considered by the judge and jury, lest, on the one side, there be a kind of inhumanity towards the defects of human nature, or, on the other, too great an indulgence given to great crimes." Again, as a measure of responsibility, he says, "Such a person, as laboring under melancholy distempers, hath yet ordinarily as great understanding as ordinarily a child of fourteen years hath, is such a person as may be guilty of treason or felony." This goes clearly to show that, in the opinion of that learned judge, it is the *strength and capacity of the mind only* that are affected by insanity; and hence he attributes to "*melancholy distempers*," the power of *diminishing*, instead of *perverting* and *deranging*, the action of the mental faculties. It is not strange that such doctrines should have been laid down in the infancy of knowledge even of the most common forms of mental alienation; but it is somewhat singular that they should be so long adhered to, either in letter or spirit, amid the constantly increasing lights which have emanated from the medical profession in reference to this dark and mysterious subject.

This doctrine of Lord Hale has had a prodigious effect upon all subsequent jurisprudence in reference to this condition of mind. It is, perhaps, more in the constructions given to it, than in the doctrine itself, that the objectionable features are to be found.

The first echo to this doctrine is found in the *trial of Arnold*, for shooting at Lord Onslow, in 1723; see 8 *Hargrave's State Trials*, 322. Arnold was a weak, idle being, strange, and sometimes mad; leading an irregular, disordered life; living solitary; lying about in barns and under hay-ricks; cursing, swearing, laughing, and throwing things about, and disturbed in his sleep by fancied noises. Lord Onslow lived in the neighborhood, and was believed by him to be the cause of all the tumults, disturbances and wicked devices that happened in the country. He declared that he sent his devils and imps into his room at night to disturb his rest, and that he constantly plagued and bewitched him, by getting into his belly or bosom, so that he could neither eat, drink, nor sleep for him. He said much about being plagued by the *Bollies* or *Bolleroys*, declaring it was better to die than live so miserably. Under the influence of these delusions, he shot at and wounded Lord Onslow.

In this case, Mr. Justice Tracy laid down the law to be, "that it is not every kind of frantic humor, or something unaccountable in a man's actions, that points him out to be such a madman as is exempted from punishment; it must be a man *that is totally deprived of his understanding and memory, and doth not know what he is doing no more than an infant, than a brute, or a wild beast. Such an one is never the object of punishment.*" And I think all would agree that such an one never should be the object of punishment. This would define a state, if possible, below the idiotic. This rule would leave every other but the lowest in the scale of idiocy, fully possessed of all the elements of responsibility. The result was that the jury found him guilty, and he was sentenced to be hung. Lord Onslow, however, was convinced of his irresponsibility, and on his application, the sentence was not executed, and he was continued in prison during his life.

On the strength of this case, it might fairly be assumed that the law, in order to exempt the insane from criminal responsibility, required an entire destitution of intellect, an absolute deprivation of reason. This ground was met, and completely overthrown, by Lord Erskine, in the case of *Rex* vs. *Hadfield*, in the year 1800. He very justly remarks that if a total deprivation of memory was to be taken in its literal sense, then no such madness ever existed in the world. That it is idiocy alone which places a man in this helpless condition; but that lunatics have not only had memory, in his sense of the expression,—they have not only had the most perfect knowledge and recollection of all the relations they stood in towards others; and of the acts and circumstances of their lives,—but have, in general, been remarkable for subtlety and acuteness.

The trial of *Hadfield* took place in the King's Bench, before Lord Kenyon, in 1800, and is fully reported in 27 *Howell's State Trials*, 1281. He was indicted for high treason in shooting at the King in Drury Lane Theatre. The defence interposed was insanity. He had been a soldier, received many severe wounds in the battle near Lisle, and was dismissed from the army on account of insanity, or partial derangement, caused by those wounds. He was afterwards subject to an annual insanity from the beginning of spring to the end of dog days. He had been confined as a lunatic. When affected by the disorder he imagined himself to hold intercourse with God, sometimes calling himself God, or Jesus Christ, and other blasphemous expressions, committing acts of the greatest extravagance, but at other times appearing rational, and discovering no symptoms of mental incapacity or disorder. The offence was committed on the 15th of May. On the 11th of May next preceding, his mind was very much disordered, and he used many blasphemous expressions. At two o'clock A. M., on the following morning, he jumped suddenly out of bed, said he was about to dash out, against the bedpost, the brains of his little son, about eight years old, of whom he was remarkably fond, and that God had ordered him to do so.

On the same and the following day, he used many incoherent and blasphemous expressions. On the morning of the 15th he was worse, went to his master's work-shop, returned to dinner at two, but said he stood in no need of meat and could live without it. In the evening, after repeating his irreligious expressions, he went out and repaired to the theatre. He sat there nearly three-quarters of an hour, when the King entered. As the audience rose up to receive him, he got above the rest, and, presenting a pistol loaded with slugs, fired it at the King's person, and then let it drop. This situation was favorable, and he took deliberate aim at the King. When apprehended he said he knew perfectly well his life was forfeited, that he was tired of life, and regretted nothing but the fate of a woman who was his wife, and would be his wife a few days longer, he supposed. He spoke calmly, and without any apparent derangement; said he did not intend any thing against the life of the King, that he knew the attempt only would answer his purpose, repeated that he was tired of life, and that his plan was to get rid of it by other means. These were the most material facts bearing on the subject.

On this occasion Lord Erskine brought his great talents to bear directly upon the subject of insanity, and with a felicity of expression peculiarly his own, exhibited in bold relief some of its leading and prominent features. The grounds he took and enforced, and in which the court acquiesced, were substantially—

1. That it is the reason of man which makes him accountable for his actions, and that the deprivation of reason acquits him of crime:

2. That it is unnecessary that reason should be entirely subverted, or driven from her seat, but that it is sufficient if distraction sits down upon it along with her, holds her trembling hand upon it, and frightens her from her propriety:

3. That the law will not measure the sizes of men's capacities, so as they be compos mentis:

4. That there is a difference between civil and criminal responsibility. That a man affected by insanity is responsible for his criminal acts where he is not for his civil:

5. That a total deprivation of memory and understanding is not required to constitute insanity:

6. The then new and all important ground, that the individual is irresponsible where the insanity consists in hallucination; where the disease springs directly from the delusive sources of thought; and all their deductions, within the scope of the malady, are founded upon the immoveable assumption of matters as realities, either without any foundation whatever, or so distorted and disfigured by fancy, as to be almost nearly the same thing as their creation:

7. That the act complained of, and sought to be avoided, must be the immediate unqualified offspring of the disease.

Although there are some concessions contained in the doctrine that cannot now be admitted as correct, yet, on the whole, the speech and the case itself was a splendid triumph of reason over prejudice and error. Its great merit consists in showing that insanity is not idiocy; and in extending the protection of the law, as well to embrace the delusions of the one, as the intellectual destitution of the other. The result was the acquittal of the prisoner.

After this clear, and it would appear, satisfactory exposition and settlement of the law as applicable to insanity, it is painful to advert to the *case of Bellingham*, 1 *Collinson on Lunacy*, 650, which occurred only twelve years after.

He was tried for the murder of the Honorable Spencer Percival, in 1812. He appears to have labored under many insane delusions. The principal of these were that his own private grievances were national wrongs; that his country's diplomatic agents abroad neglected to hear his complaints and assist him in his troubles; that his losses would be made good by the government; that the government would not interfere in his affairs; and he determined, by assassinating its head, to bring his affairs before the country, supposing then he would have an opportunity of making a public statement of his grievances, and of obtaining a triumph over the attorney-general. These were all delusions, and under their influence he shot the prime minister, Spencer Percival.

In this case Lord Mansfield charged the jury in substance, that the single question for them to determine was whether, when he committed the offence charged upon him, he had sufficient understanding to distinguish *good from evil*, *right from wrong*, and that murder was a crime not only against the law of God, but against the law of his country. He was convicted and executed.

In this case the test assumed as the only one, was the power of distinguishing *good from evil*, *right from wrong*. And this, or more definitely, *the power of distinguishing right from wrong*, has ever since been adopted as a test, and sometimes as the only one, that marks the line between sanity and insanity, responsibility and irresponsibility. This test was adopted only twelve years after Lord Erskine's exposure of its entire fallacy as an exclusive test, in his great speech on the trial of Hadfield. He makes the supposition that the character of an insane delusion consisted in the belief that some given person was any brute animal, or an inanimate being, (such cases having existed); and that on a trial for murder, it should be made to appear, that he firmly believed the man he had destroyed was a potter's vessel, his mind in every other respect being sane. Then suppose further, that he believed the man whom he destroyed, but whom he destroyed as a potter's vessel, to be the property of another, and that other his enemy, whom he had *sought to injure* by this destruction of his property.

As this may now be regarded as the test best known to the law, it may be important to enquire as to the elements that compose it, and what effect they exert upon the insane mind.

The knowledge of right and wrong implies two things:

1. A perception or recognition, by the mind, of those actions or things, in themselves or others, in regard to which right or wrong may be predicated: and,

2. The feeling of what is right or wrong, in itself, in reference to such actions or things.

The first belongs to the intellectual department, the second to that of feeling. The first consequently depends upon the action of those perceptive faculties that take cognizance of actions and things; the second upon the faculty of conscientiousness, the moral sense of the metaphysicians. To enable one to judge of the moral qualities of actions and things, both these are necessary. Both are susceptible of cultivation and improvement. Both may exist together, or be wanting together, or the one may exist without the other. The one does exist without the other in the brute creation. They perceive actions and things, but feel not their moral relations. They are utterly unable to distinguish between an *injury* and a *wrong*, between a blow that is *accidental*, and one that is *intentional*.

With us, the one may be so much wanting, from original defect, or subsequent occurring disease, as to divest of the elements of responsibility; or the intellectual faculties may be so warped or perverted by insane delusions, as to deprive the other of all power of exerting its agency in reference to those acts or things involved in the delusion.

Dr. Ray, whose long experience with the insane enables him to speak from observation, thus eloquently remarks:

"In no school of logic, in no assembly of the just, can we listen to closer and shrewder argumentations, to warmer exhortations to duty, to more glowing descriptions of the beauty of virtue, or more indignant denunciations of evil doing, than in the hospitals and asylums for the insane. And yet many of these very people may make no secret of entertaining notions utterly subversive of all moral propriety, and perhaps are only waiting a favorable opportunity to execute some project of wild and cruel violence. The purest minds cannot express greater horror and loathing of various crimes, than madmen often do, and from precisely the same causes. Their abstract conceptions of crime, not being perverted by the influence of disease, presents its hideous outlines as strongly defined as they ever were in the healthiest condition; and the disapprobation they express at the sight, arises from sincere and honest convictions. The *particular* criminal act, however, becomes divorced, in their minds, from its relations to crime in the *abstract*; and, being regarded only in connexion with some favorite object, which it may help to obtain, and which they see no reason to refrain from pursuing, is viewed, in fact, as of a highly laudable and meritorious nature. Herein, then, consists their insanity; not in preferring vice to virtue, in applauding crime and deriding justice, but in being unable to discern the essential identity of nature, between a particular crime and all other crimes, whereby they are led to approve, what, in general terms, they have already condemned." *Ray*, 289, § 17.

In confirmation of these views, Baron Hume, a Scotch writer, speaking in reference to this test, says, that "every judgment in the matter of right and wrong, supposes a case, or state of facts to which it applies, and though the person may have that vestige of reason, which may enable him to answer in the general, that murder is a crime, yet if he cannot distinguish a friend from an enemy, or a benefit from an injury, but conceives everything about him to be the reverse of what it really is, and mistakes the ideas of his fancy in that respect, for realities, those remains of intellect are of no sort of service to him in the government of his actions, in enabling him to form a judgment as to what is right or wrong on any particular occasion."

Although there are conflicting decisions upon this point, yet it may on the whole fairly be assumed, that an advance has been made by the law in this respect; that the enquiry is not limited to the ideas of right and wrong entertained by the prisoner, in the general or abstract, but is to be made in reference to the identical act complained of as criminal.

Mr. Chitty, in *Chitty's Medical Jurisprudence*, 354, says: "In practice, to prevent the jury being embarrassed by any technicalities respecting the import of this term insane, the substantial question presented to the jury in this and all cases, whether of alleged idiocy, lunacy, or insanity, either in general or monomania (that is, delusion confined to a particular subject,) is, whether, at the time the alleged criminal act was committed, the prisoner was incapable of judging between right and wrong, and did not *then know he was committing an offence against the law of God and of nature?*"

In the case of *The King* vs. *Bowler*, which occurred in 1812, (1 *Collinson on Lunacy*, 673,) the defence interposed was insanity.

Mr. Justice Le Blanc, in that case, charged the jury, that it was for them to determine whether the prisoner, when he committed the offence with which he stood charged, was incapable of distinguishing right from wrong, and not under the influence of any *illusion* in respect to the prosecutor, which rendered his mind at the moment insensible to the nature of the act he was about to commit; since, in that case, he would not be legally responsible for his conduct. But if they should be of opinion that when he committed the offence, he was capable of distinguishing right from wrong, and not under the influence of such an illusion as disabled him from discerning that he was doing a wrong act, he would be amenable to the justice of his country, and guilty in the eye of the law.

The late case of *The King* vs. *Orford*, (5 *Carrington & Payne*, 168,) was a trial for the murder of a man named Chisnall. The defence was insanity, evidenced by *delusion*. He labored under the delusion that the inhabitants of Hadleigh, and particularly the deceased, were continually issuing warrants against him, with intent to deprive him of liberty and life. Under the influence of that insane idea, he would frequently abuse persons whom he met in the street, and with whom he never had any dealings or acquaintance of any kind. In his waistcoat pocket a paper was found, headed "List of Hadleigh conspirators against my life." The name of the deceased was among them. There was also found among his papers, an old summons, about a rate, at the foot of which he had written, "This is the beginning of an attempt against my life."

In this case, Lord Lyndhurst charged the jury, that they must be satisfied, before they could acquit the prisoner on the ground of insanity, that he did not know, when he committed the act, what the effect of it, if fatal, would be, with reference to the crime of murder. The question was, *Did he know that he was committing an offence against the laws of God and nature?* The prisoner was acquitted on the ground of insanity.

The language of courts, in reference to this test, is always more or less ambiguous, arising from the fact, that the feeling of right and wrong may, and more generally does, prevail, amid the most unfounded delusions. Whether, therefore, the courts have reference simply *to the feeling*, and the *knowledge consequent upon it*, or *to its being exercised in reference to things as they actually exist, or as any sane mind would understand them to exist*, may make a most material difference. The latter might be a proper test of insanity, but the former would by no means be necessarily so. If the verdicts rendered by juries are to be received as evidence of the construction put upon the charge, they will generally favor the idea that their action has been upon the former.

Another test proposed, and upon which considerable reliance has at times been placed, is the *design* or *contrivance* manifested in the commission of the act.

Mr. Russell (1 *Russell on Crimes and Misdemeanors*, 13,) lays this down as one of the established principles that are to guide us in our conclusions on this subject.

In the case of *Arnold*, great stress was laid on the fact of his having purchased shot of a much larger size than he usually did when he went out to shoot, with the design, then formed, of committing the murder he afterwards attempted.

In the case of *Bellingham*, the Attorney General declared, that "even if insanity in all his other acts had been manifest, yet the *systematic correctness* with which the prisoner contrived the murder, showed that he possessed a mind, at the time, capable of distinguishing right from wrong." It would probably have been very difficult for the Attorney General to have shown how the one was connected with the other; the real connection being about the same as that which exists between the motion of a muscle and the secretion of a gland in the living subject. The sufficiency of this as a test, can be best settled by referring to the opinions of those who have a practical acquaintance with the insane.

"What," says *Dr. Ray*, *page* 37, § 21, "must be thought of the attainments of those learned authorities in the study of madness, who see in the power of *systematic design* a disproof of the existence of insanity, when, from the humblest menial in the service of a lunatic asylum, they might have heard of the ingenuity of contrivance, and adroitness of execution, that preeminently characterize the plans of the insane ?"

This *power of systematic design* is, when analyzed, nothing but the *sentiment of cunning* developing itself by means of *intellectual combinations.* The sentiment itself is a primitive power or faculty of the mind, and is of a low order, in fact, a mere animal instinct, being found in the brute creation. It is one of those powers that are generally found specially active among the insane. Very extraordinary instances are given, in works on insanity, going to show the very great extent to which this faculty has developed itself among that unfortunate class of individuals. See *Ray*,39 – 40, § 21.

Independent of its being generally affected in connection with other powers of the mind, the fact of its being a primitive power or faculty, independent in its function and action, renders it liable itself to deranged manifestation; and in that case, according to this doctrine, we should have the actual derangement of one faculty cited as proof of the sanity of the entire mind. So far as relates to its displaying itself through intellectual combinations, or the exercise of those faculties that adapt means to ends, we have the instance given by Pinel of the maniac who endeavored to discover perpetual motion, and in his efforts to discover it, constructed some very curious machines. Also in the one mentioned by Esquirol, of the mad general who invented an improvement in the construction of a military weapon, which was subsequently adopted in the army. It may well be doubted whether the plans and proposed arrangements for the management of his kingdom, which are formed in the brains of the maniac who conceives himself a king, might not furnish very useful hints to those who are really such; or, if their station depends on a *delusion*, it happens to be one very generally prevailing among all those who yield them obedience.

These remarks are not intended to exclude the legitimate inference deducible from the resort to design and contrivance by the sane mind. In such, when preceding, and connected with the criminal act, it affords evidence of deliberate intention to commit it, and hence of the evil intent and malice which constitute the highest elements of crime. The only object is to rescue the really irresponsible from the operation of a test entirely inapplicable to their case, and therefore insufficient to prove anything whatever in relation to their sanity or insanity.

We now come to another test, that proposed by Lord Erskine, viz., *Delusion.* The correctness of this test rests not alone on the authority of Lord Erskine, and its approval by Lord Kenyon in the case of Hadfield. It is also sanctioned by Sir John Nicholl, in the case of *Dew* vs. *Clark*, (3 *Addams*, 79,) who says, "The true criterion, the true test, of the absence or presence of insanity, I take to be, the absence or presence of what, used in a certain sense of it, is comprisable in a single term, namely, *delusion.* In short, I look upon delusion, in this sense of it, and insanity to be, almost, if not altogether, convertible terms."

This test, as we shall presently see, has been adopted in this country. To enable us to judge properly of the value and sufficiency of it, we should understand both its nature and its sources. As understood by medical jurists, it means the assumption, by the mind, of things as realities which have no existence as such. It is the substitution of the baseless creations of one's own mind, and the action upon them, instead of things as they really exist.

Such being their nature, their source must be obvious, viz., the intellect. It is alone the province of the intellect to form ideas, and as delusions consist in ideal creations, it is clear they can be referable to no other source but that of the intellect. Their existence, therefore, may be received as evidence of intellectual mania, either general or partial.

Delusion, where it is proved to exist, may fairly be received as a test of insanity; but is its absence equally a test of sanity? This would undoubtedly be true, if the human mind consisted of nothing but intellect. But that, as we have already seen, is made up of propensities, sentiments, and emotions, as well as ideas; or, in other words, it feels as well as thinks. These propensities and sentiments, as we have already seen, are liable to derangement, giving rise to the phenomena of moral mania. This form of derangement can hardly yet be said to be distinctly recognized by the courts, although its existence may be affirmed to be clearly established. That form of it which has the most frequently come up for investigation, and afforded the greatest puzzle to courts, is the derangement of the destructive propensity, giving rise to homicidal mania. This will properly arise for more especial investigation in another connection. Although jurists have in many cases acquitted the prisoner, who was shown clearly to have destroyed under the insane impulse, yet the law can hardly yet be said to have framed a principle, under which the exemption from liability can be claimed.

It will be readily perceived from all this, that the course of decisions has been somewhat vaccillating in reference to the tests of mental alienation. The old test of *total deprivation of understanding*, adopted in the case of *Arnold*, has certainly been laid aside. That of *delusion*, adopted in the case of *Hadfield*, was laid aside in that of *Bellingham*, tried only twelve years afterwards, and *the power of distinguishing right from wrong* adopted in its place. This latter test was lost sight of in the trial of *Martin* for setting fire to the York Minster, and that of *delusion* again adopted. The *power of distinguishing right from wrong* was again adopted in a somewhat modified form, in the case of *The King* vs. *Orford*, and the test of *delusion* entirely disregarded. Again, in a late case occurring in 1837, that of *Greensmith*, (see statement of the case in *Taylor*, 513,) Mr. Justice Parke told the jury that, as regards the effect of insanity on responsibility for crime, "it is merely necessary that the party should have sufficient knowledge and reason to discriminate between *right and wrong*," thus rejecting the modification of Lord Lyndhurst, and leaving it simply on the power to discriminate between right and wrong in the abstract, and not as applied to the particular act in question.

In the case of *The King* vs. *Oxford*, for shooting at the Queen, which occurred a short time after the last, and is reported in 9 *Carrington & Payne*, 525, Chief Justice Denman told the jury "that the question for them to decide was, whether the prisoner was laboring under that species of insanity which satisfied them that he was quite unaware of the nature, character, and consequences of the act he was committing; or, in other words, whether he was under the influence of a diseased mind, and was really unconscious at the time he was committing the act, that it was a crime."

In 1843 occurred the trial of McNaughton for killing Drummond, which excited through England a great degree of interest. In this case, it was shown that the prisoner was latterly of a sullen and reserved character; that he imagined himself the object and victim of unrelenting persecution; that he was surrounded by persons who had formed a conspiracy against his comforts, character and life, and that these persons were always in pursuit of him. The deceased was a stranger to him, but imagined to be one of his persecutors, and that it was necessary to kill him in order to free himself from persecution. In other respects, he appeared sound, and was shrewd in his business transactions, carefully managing his own affairs. The medical witnesses, eight in number, testified that at the time he committed the act, he was laboring under a delusion, and that he was led on by an impulse, so irresistible that nothing but a physical impediment could have prevented his committing it..

Lord Chief Justice Tindal in this case instructed the jury, that before convicting him, they must be satisfied that, when committing the criminal act, he had that competent use of his understanding as that he was doing a wicked and wrong thing; that he was sensible it was a violation of the law of God and man. The prisoner was acquitted.

This trial occasioned the submitting of certain questions, by the House of Lords, to the fifteen judges, with the view of eliciting their opinions in regard to criminal responsibility.

As these questions and answers were designed to settle the law in England on this subject, it is proper to notice here those that have reference to the tests to be employed:

Question I. "What is the law respecting alleged crimes committed by persons afflicted with insane delusions in respect of one or more particular subjects or persons; as, for instance, when at the time of the commission of the alleged crime, the accused knew he was acting contrary to law, but did the act complained of with the view, and under the influence of some insane delusion, of redressing or avenging some supposed grievance or injury, or of producing some supposed public benefit?

Answer. The opinion of the judges was, *that, notwithstanding the party committed a wrong act, while laboring under the idea that he was redressing a supposed grievance or injury, or under the impression of obtaining some public or private benefit, he was liable to punishment.*"

Question II. "What are the proper questions to be submitted to the jury, when a person alleged to be affected with insane delusion, respecting one or more particular subjects or persons, is charged with the commission of a crime—murder, for example—and insanity is set up as a defence?

Answer. Before a plea of insanity should be allowed, undoubted evidence ought to be adduced, *that the accused was of diseased mind, and that at the time he committed the act, he was not conscious of right and wrong. Every person was supposed to know what the law was, and therefore nothing could justify a wrong act, except it was clearly proved that the party did not know right from wrong.*

Question IV. If a person, under an insane delusion, as to existing facts, commits an offence in consequence thereof, is he hereby excused?

Answer. If the delusion were only partial, the party accused was equally liable with a person of sane mind. If the accused killed another in self-defence, he would be entitled to an acquittal, but if the crime were committed for any supposed injury, he would then be liable to the punishment awarded by the laws to his crime."

What the judges meant by a *delusion that is only partial*, is perhaps difficult of explanation. I am not aware of any known instance of *general delusion;* that is, of delusion universally entertained in reference to every thing. If the judges intended that the *partial character of it* should be understood in reference to the particular delusion entertained; that is, that the individual alleged to be insane, had some glimpses of truth, and some delusive ideas in reference to the particular thing or act done or complained of, then it is apprehended there would be great and insuperable difficulties in ever making any application of it.

Again, the judges seem to have adopted the *right and wrong test*, without even annexing to it the qualification proposed by Lord Lyndhurst, unless they use the terms "right and wrong" as synonymous with those of "lawful and unlawful," which there is no sufficient reason for presuming.

In the trials that have taken place in this country, where the plea of insanity has been interposed, so far as they have become generally known, the tests adopted by the common law of England, with the exception of the law as recently laid down by the fifteen judges, have in general been adopted.

In 1835 occurred at Washington the trial of *Lawrence*, for shooting at General Jackson, then President of the United States. See *Vol.* 48 *of Niles' Register*, 119. The delusion under which he was shown to have labored, was that he supposed himself entitled to the English crown, and General Jackson refused to grant him a sufficient sum of money to enable him to assert his right to it, wherefore he supposed himself justified in shooting him.

The correctness of the doctrine as laid down and asserted by Lord Erskine, and acquiesced in by Lord Kenyon in the case of *Hadfield*, was admitted by the court, and upon the strength of it Lawrence was acquitted.

In the case of *Theodore Wilson*, tried in York county, Maine, in the year 1836, for the murder of his wife in a paroxysm of insanity, the court charged the jury that if they were satisfied the prisoner was not of *sound memory* and *discretion*, at the time of committing the act, they were bound to return a verdict of acquittal. *Ray*, 49, § 27.

In the trial of Corey for the murder of Mrs. Nash, in New Hampshire, in 1829, the court, Chief Justice Richardson, stated in his charge to the jury, that the only question for them to settle was, whether he was of sane mind when the deed was done. *Ray*, § 27.

On the trial of Prescott for the murder of Mrs. Cochran, substantially the same language was made use of.

On the trial of Rogers, in July 1843, for the murder of Mr. Lincoln, in the State Prison of Massachusetts, the court, Chief

Justice Shaw, charged the jury, that insanity or delusion is an excuse for crime, in two ways; first, where it amounts to a firm belief that one is liable to lose his own life, or suffer some great bodily harm; secondly, where some violent outbreak occurs, which, taken in connexion with former acts, indicates that the will was overborne. The questions for them to decide were, whether such a delusion existed in the mind of the accused; whether he did the act under an insane, but firm belief, that the deceased was going to shut him up with some dangerous design, or not for a slight punishment; whether the facts indicate that the deed was done at a moment when the delusion was uncontrollable. *Ray*, 49 – 50, § 27.

On the trial of Abbot by the Superior Court of Connecticut in 1841, for the murder of his wife, the jury were instructed to acquit the prisoner, "if they found that, at the time of committing the act, he was insane; had not sufficient understanding to distinguish right from wrong, and did not know that the murder of his wife was an offence against the laws of God and nature." *Ray*, 50, § 27.

In this State, the Revised Statutes (2 *R. S.*, 697, § 2,) provide that no insane person can be tried, sentenced to any punishment, or punished, for any crime or offence, while he continues in that state; and that no act done by a person, in a state of insanity, can be punished as an offence.

If the last clause were allowed a construction as broad as its terms indicate, it would be only necessary to prove any species of mental alienation, although entirely unconnected with the act complained of, and the exemption from liability would follow of course.

This part of the section received a construction in the case of *Freeman* vs. *The People*, (4 *Denio*, 9,) in whch Mr. Justice Beardsley says that the clause is very comprehensive in its terms, and at first blush, might seem to exempt from punishment every act done by a person who is insane *upon any subject whatever.* The court in that case interpreted the phrase as if it had read "no act done by a person in a state of insanity," *in respect to such act*, "can be punished as an offence." It required an *insane act*, and not merely the act of an *insane person*, in order to have applied to it the rule of exemption.

In the case of *Kleim*, tried before Judge Edmonds, May 21, 1845, (see 2 *Vol. American Journal of Insanity*, 245,) we find some judicious and sound remarks relative to the rule of law to be applied to the insane condition. The judge begins by stating that the enquiry to be made under the rule of law, as now established, was as to the prisoner's knowledge of right and wrong, at the time of committing the offence. He takes the clear distinction between that knowledge in the abstract, and as applied to the act in question, by stating that the question whether the accused knew the difference between right and wrong is not to be put generally, but in reference to the very act with which he is charged; and the inquiry therefore is, had the accused a sufficient degree of reason to know that he was doing an act that was wrong, or was he laboring under that species of mental aberration which satisfied the jury that he was quite unaware of the nature, character, and consequences of the act he was committing.

Again he broaches another ground which if not new, has certainly been but little known to the law. "If," says he, "some controlling disease was in truth the acting power within him, which he could not resist, or if he had not a sufficient use of his reason to control the passions which prompted the act complained of, he is not responsible; but we must be sure not to be misled by a mere impulse of passion, an idle frantic humor, or unaccountable mode of action, but enquire whether it is an absolute dispossession of the free and natural agency of the human mind."

Again, he remarks, "It must be borne in mind that the *moral as well as the intellectual faculties may be disordered by the disease, so as to deprive the mind of its controlling and directing power.*" The first clear legal recognition I have noticed of moral insanity.

In order, continues the judge, "to constitute crime, a man must have memory and intelligence to know that the act that he is about to commit is wrong—to remember and understand that if he commits the act, he will be subject to punishment; and reason and will, to enable him to compare and choose between the supposed advantage or gratification to be obtained by the criminal act, and the immunity from punishment which he will secure by abstaining from it. If, on the other hand, he have not intelligence and capacity enough to have a criminal intent and purpose; and if his moral or intellectual powers are either so deficient that he has not sufficient will, conscience, or controlling mental power; or if, through the overwhelming violence of mental disease, his intellectual power is, for the time, obliterated, he is not a responsible moral agent, and is not punishable for criminal acts."

He further instructed the jury that they were to consider, as aids to a just conclusion, the extraordinary and unaccountable alteration in his whole mode of life; the inadequacy between the slightness of the cause and the magnitude of the offence; the recluse and ascetic life which he had led; his invincible repugnance to all intercourse with his fellow-creatures; his behavior and conduct at the time the act was done, and subsequently during his confinement in prison; and the stolid indifference which he alone had manifested during the whole progress of the trial, upon the result of which his life or death was dependent.

The prisoner was acquitted, and subsequently confined in the Asylum in Utica, where it was stated, in 1846, that his bodily health was good, but his mind was nearly gone, quite demented.

Another criminal trial which, taking the wonderful interest it excited, in connexion with the importance of the principles it involved, has perhaps never been equalled in this State, was that of *William Freeman*, for the murder of *John G. Van Nest*, tried in Auburn, July 6, 1846. This has been reported in full by *Benjamin F. Hall, Esq.*, of Auburn. The volume will be found to contain an immense amount of valuable information on the subject of mental alienation, and the application of legal principles to an insane condition of mind. The prisoner had been a convict in the State's Prison at Auburn, for the term of five years, for stealing a horse, of which he was probably innocent. On his liberation, he entertained the idea that as he was sent to the State's prison innocently, and had there labored for five years, he was entitled to be paid for that labor, and endeavored to commence suits against some individuals to obtain his compensation. Failing to obtain anything in this way, he next seems to have supposed he must commence killing for that purpose, and accordingly began with the family of Van Nest, residing about four miles from Auburn, where he killed four and badly wounded another. There were many other facts in the case which cannot here be alluded to. On the arraignment of the prisoner, his counsel, the *Hon. William H. Seward*, tendered, in behalf of the prisoner, a *plea of insanity*, upon which the district attorney took issue. The court then proceeded to the trial of that issue, which was preliminary, and to have the effect only of determining whether the prisoner was then insane, or sufficiently sane for the trial to proceed.

The jury of triers having heard much testimony on the subject, finally returned for a verdict, "*We find the prisoner sufficiently sane in mind and memory to distinguish between right and wrong.*"

To the sufficiency of this verdict, the prisoner's counsel objected, and asked the court to instruct the jury to find a verdict upon the issue raised by the plea of insanity, that is, whether the prisoner is "sane or insane." The court refused, and the counsel excepted, and this constituted the most important point raised on the bill of exceptions, and which was presented to the Supreme Court. It was, in fact, no other than the finding whether the capacity to distinguish between right and wrong was a finding of sanity; or, in other words, whether sanity, and the capacity to distinguish between right and wrong, were equivalent terms. On this point, in the case of *The People* vs. *Freeman*, before referred to, the court say, that "in the case at bar, the court professed to furnish a single criterion of sanity, that is, a capacity to distinguish between right and wrong. This, as a test of insanity, is by no means invariably correct; for while a person has a very just perception of the moral qualities of both actions, he may, at the same time, as to some one in particular, be absolutely insane, and consequently as to this be incapable of judging accurately between right and wrong. If the delusion extends to the alleged crime, on the contemplated trial, the party manifestly is not in a fit condition to make his defence, however sound his mind may in other respects be." This may certainly be regarded as settling the question in this State, that the power of distinguishing between right and wrong, in the abstact, and insanity, are not convertible terms.

On his trial, under the arraignment, the prisoner's counsel relied much on the law as laid down by Judge Edmonds in the case of Kleim. The Attorney-General, Hon. John Van Buren, insisted, that to render a man irresponsible the law required *an incapacity to distinguish between right and wrong in regard to the particular act committed, or an inability from disease to resist the commission of the act.* A rigid construction of this rule would exclude those acts which resulted from delusion.

Judge Whiting, in his charge to the jury, instructed them to consider that sanity consists in having a knowledge of right and wrong, as to the particular act charged to have been done by an individual, and in possessing memory, intelligence, reason, and will. The judge further laid down the law to be, "That if the jury find that he was unaware, from insanity, of the nature of the act he committed, the prisoner should be acquitted. If disease was the acting power within him, which he could not resist, he should be acquitted. If he had not sufficient use of his reason, from insanity, to control the passions which prompted the murder, he is not responsible. If the jury are satisfied that there was a dispossession, by disease, of the free and natural agency of his mind, he is not responsible."

The judge also instructed the jury to inquire whether the prisoner was laboring under a delusion, and submitted to them whether his acts were the effects of delusion, or of an unsound and erroneous judgment as to his rights, and the way of redressing his supposed wrongs.

The jury found a verdict of guilty, and sentence of death was passed upon him, to be executed on the 18th day of December then next. A writ of error was allowed upon the bill of exceptions taken, and on review before the Supreme Court, a new trial was granted upon the points raised in reference to the preliminary trial or proceeding, the principal one of which I have already alluded to.

While these proceedings were pending, the prisoner was sinking into a lower state of bodily health and mental imbecility, until finally he died in his cell, on the 21st August, 1847. A post-mortem examination was made of his brain, in the presence of a number of highly respectable physicians, the result of which was that the brain was found extensively diseased, and of a character showing very satisfactorily that the disease, in its incipient stages, must date back to a period anterior to the supposed criminal act for which he was tried and convicted.

It will be seen, from a careful review of the whole matter, that the legal principles hitherto laid down as applicable to the criminal responsibility of the alleged insane, are either too deficient, or of too vague and indefinite a character, justifying the remark of Judge Edmonds, in the case of Kleim, that "the law, in its slow and cautious progress, still lags far behind the advance of true knowledge."

One difficulty seems to be the attempt to apply the same principle to different conditions of deranged mind. Of these, there are at least four different conditions.

1. The first of these is where there is a clear mental deficiency; where the very notion of crimes, laws, and punishments is either confused and imperfect, or not entertained at all; and where the test of ability to distinguish right from wrong, if it should be applied anywhere, has an application.

2. The second is where *delusion* lies at the sources of thought, and where the act itself is directly traceable to it.

3. The third is where the act results from insane impulse, and is irresistible; and, as in the first, there is a want of intellect, so here there is a lack of will.

4. The fourth is where decided symptoms of derangement have been manifested, but the immediate act is prompted by the receipt of a real injury, as in the case of Lord Ferrers. See *Ray's Med. Juris. of Insanity*, § 128.

The three first mentioned have, on different occasions, although not uniformly, been recognized by the law. The last has not yet been recognized.

Insanity may exonerate from punishment, if it occur after the crime is committed. The law will not permit a man while in an insane state, whenever it occured, either to be tried, or have judgment passed upon him, or to have that judgment executed.

Legal Consequences of Idiocy, Imbecility, and Dementia, comprising all cases of Defective Development or Power of Mind.

The legal consequences attaching to this condition of mind has reference both to criminal and civil responsibility. So far as respects the first, the law always primarily regards the *intent to injure*, and hence requires that to be first made out to the satisfaction of the court or jury. It also regards the intent to commit the kind of injury legitimately deducible from the act.

What then are the elements of the *intent to injure?* They may be summed up in,

1. A perception by the intellect, and an appreciation by the moral powers, of the relations in which rational human beings stand towards each other:
2. Sufficient power of propensity to furnish the impulses necessary to invade the rights of others:
3. Sufficient intellectual power to perceive the relevancy of means to ends, and the ruinous results to others to which those impulses, if followed, would naturally or necessarily lead; and
4. Sufficient strength of moral power, or of the faculty of conscientiousness, to feel the deviation from right, and to know that the act contemplated is a wrong, and not simply an injury.

A radical, fatal defect in either one of these should render the being irresponsible. The questions then in any given case to be asked and answered are,

1. Are the relations of human beings perceived?
2. Are the impulses sufficiently strong that lead to the act?
3. Are the nature of the means employed, and end accomplished, understood?
4. Are the moral results felt to be wrong?

The cases of Schmidt, Delepine, Prescott, Barclay, and Lecouffe are given by Dr. Ray, to which the reader is referred as instances illustrating this branch of enquiry. It was probably in reference to this condition of mind that the test of power to distinguish between right and wrong was first adopted, and to this only that it can have a proper application.

In reference to the civil liabilities of the mentally defective, or the principle that divests them of their property, and absolves them from their contracts, some considerable difficulty has been experienced. The issuing, execution, and return of a commission, has already been briefly adverted to. The difficulty mostly arises out of the individual case presented. One very curious in its details is that of Mr. Edward Davies, which may be found in Guy, 320-21. He was a tea dealer in London, and had grown rich in the business. He was of a timid and yielding disposition, so that although twenty-seven years of age and carrying on an extensive and lucrative business, he was completely subject to the authority of his mother. He neither carried nor spent money without her permission, and dared not quit the house without her leave. He was easily agitated, anxious and fanciful about his complaints, vain of his literary acquirements, abject and timid, but an able and successful tradesman, and thoroughly competent to conduct his business. He became restive under his mother's restraint, and under the influence of it his bodily health and mental tranquility became impaired. He exhibited occasional incoherence and excitement and antipathy to his mother, which was considered by some as a delusion. Proceedings were instituted against him, and it was remarked that the very persons who were trying to confine him as unfit to take care of his business, were themselves consulting him about the management of that very business. After a brief period of confinement his agitation subsided, his incoherence diminished, and nothing but his antipathy to his mother and certain suspicions, considered as delusions, remained. A commission was granted, but on its execution he was restored to liberty, and the management of his property. The foregoing, if an instance of incapacity at all, must have resulted from the defective development of some of the mental powers coupled with a tendency to intellectual mania or the entertainment of delusion.

The legal principle in relation to contracts applicable to this condition of mind is thus laid down by Kent, 2 *Kent's Com.*, 452.

"Imbecility of mind is not sufficient to set aside a contract, when there is not an essential privation of the reasoning faculties, or an incapacity of understanding and acting in the ordinary affairs of life. This incapacity is now the test of that unsoundness of mind which will avoid a deed at law. The law cannot undertake to measure the validity of contracts by the greater or less strength of the understanding; and if the party be *compos mentis*, the mere weakness of his mental powers does not incapacitate him."

In the case of *Jackson ex dem. Cadwell and others vs. King & King*, 4 *Cowen*, 207, the point in controversy was the validity of a deed executed by a grantor, claimed on the one part to have been incompetent, but whose competency was asserted on the other. Many authorities will be found cited in the case. The court there lay down the doctrine that it must be shown that the grantor was *non compos*, within the legal acceptation of the term; that it was not a partial, but an entire loss of the understanding. The ground is taken that the common law draws no discriminating line by which to determine how great must be the imbecility of mind to render a contract void, or how much intellect must remain to uphold it. That mere weakness of understanding is not, of itself, any objection in law to the validity of a contract. That if a man be legally *compos mentis*, he is the disposer of his own property, and his will stands for a reason for his actions. Substantially the same principles were affirmed in the case of *Odell vs. Buck*, 21 *Wend.*, 142.

But although courts of law refuse to interfere and declare void a contract made by an imbecile, unless the imbecility be of such a character, and prevail to such an extent, as to amount to unsoundness of mind, yet courts of equity and even of law, interfere to vacate contracts, and all other acts entered into by a party laboring under a great degree of weakness or imbecility of mind, on the ground of fraud. 1 *Story's Equity Jurisprudence*, 227. The difference between courts of law and equity in relation to taking cognizance of matters of fraud is, that the former require the fraud to be proved, while the latter will, under certain circumstances, presume it. *Jackson vs. King*, 4 *Cowen*, 207–220.

It is, therefore, principally in courts of equity that causes of this character come up for investigation, and whenever a case is presented for equitable interference, the whole matter is thoroughly sifted, all the circumstances examined, all the presumed influences inquired into, the consideration of the contract, the inducements held out, the nature of the contract, in fine, every thing that can possibly aid in throwing any light upon the act of the parties, and the knowledge, views and motives under which the transaction has occurred. Whenever, from the nature of the transaction, there is not evidence of entire good faith, or the contract or other act is not seen to be just in itself, or for the benefit of these persons, courts of equity will set it aside, or make it subservient to their just rights and interests. 1 *Story's Equity Jurisprudence*, § 228.

The doctrine, in general terms, may be stated to be—that the acts and contracts of persons of weak understandings, and who are thereby liable to imposition, will be held void in courts of equity, if the nature of the act or contract justify the conclusion, that the party has not exercised a deliberate judgment, but that he has been imposed upon, circumvented, or overcome by cunning, or artifice, or undue influence. 1 *Story's Equity Jurisprudence*, 250, § 238 ; *Gartside vs. Isherwood*, 1 *Bro. Ch. R.*, 560 - 61.

The great rule of the court as announced by *Lord Eldon* in the case of *Gibson vs. Jeyes*, 6 *Vesey*, 266, *page* 278, is that "he who bargains in a matter of advantage with a person placing confidence in him, is bound to show that a reasonable use has been made of that confidence ; a rule applying to trustees, attorneys, or any one else." The same principle is asserted with approval in the case of *Whelan vs. Whelan & Whelan*, 3 *Cowen's Rep.*, 537, in which on *page* 572, the court say that "a contract obtained from one party, so much in the power of the other, cannot be sanctioned, if confidence has been abused, if there is inadequacy of price, or the inference is plain, that advantage has been taken of age and imbecility." This may justly be considered as a leading case on this subject, and very important in reference to the doctrine discussed and settled by it.

Inadequacy of consideration alone is not considered as sufficient to authorise equity to interfere and presume mental weakness sufficient to vacate contracts entered into between parties otherways competent, unless it is so very great as to demonstrate some gross imposition, or some undue influence; or, in other words, unless it is made out to such extent as to shock the conscience, and amount, in itself, to evidence of fraud. In such case it would be deemed sufficient. 1 *Story's Equity Jurisprudence*, 257, § 245–6; *Coles vs. Trecothick*, 9 *Vesey*, 246; *Underhill vs. Harwood*, 10 *Vesey*, 219; *Gwynne vs. Heaton*, 1 *Bro. Ch. R.*, 1.

The case of *Portsmouth vs. Portsmouth*, 1 *Haggard*, 359, involves the consideration of the extent of capacity requisite to enable the party to enter into a valid matrimonial contract. A great number of witnesses were examined, from which it appeared, that the Earl of Portsmouth possessed a capacity equal to the ordinary transactions of life; that he had a good memory when at school, and made progress in arithmetic and the languages; that he settled accounts with agents, attended public meetings and committees, prosecuted an offender, and was examined as a witness.

On the contrary it appeared that he had always been treated by his family as one of feeble capacity; that his servants were his play-fellows, upon whom he was in the habit of playing all sorts of tricks; that he was fond of driving a team, and that one was kept for his amusement, as a toy or plaything for him; that he had a propensity for bell-ringing, was fond of slaughtering cattle, and indulged in wanton cruelty towards man and beast. That a medical man, taken into the family, obtained complete ascendency over him. That he finally delivered him up to the earl's trustees in London, one of whom, within one week after, married him to his own daughter. And it was the validity of this marriage that was called in question.

The court, Sir John Nicholl, observed that the capacity for instruction and improvement is possessed even by the brute creation, and, therefore, did not, of itself, disprove the fact of imbecility; that his testifying in a court of justice required little, if anything, more than memory; that his behavior in company, and his few observations on the state of the weather, horses and farming, were not incompatible with great imbecility of mind, because under the restraint produced by formal company, and by the sense of being observed, the more prominent features of imbecility would be shaded, and the individual might pass as possessing a considerable degree of understanding. He declared the marriage null and void.

Another case in which the marriage contract was annulled on the ground of imbecility in one of the contracting parties, was that of *Miss Bagster*, reported in 1 *Beck's Med. Juris.*, 579. She was a lady of fortune and had perpetrated a runaway match with a Mr. Newton. Her friends applied for a dissolution on the ground that she was of unsound mind. The facts stated were that she had been a violent, self-willed, and passionate child; that this continued as she grew up; that she was totally ignorant of arithmetic, and therefore incapable of taking care of her property; that she had manifested a great fondness for matrimony, having engaged herself to several persons, and that, in many respects, she evinced little of the delicacy belonging to her sex. She appeared to have memory, but to lack judgment and reasoning power. Dr. Gordon did not consider her capacity to exceed that of a child of seven years of age. On her examination before the commissioners her answers were pertinent and in a proper manner. Both Drs. Morrison and Haslam had visited her and did not consider her imbecile or idiotic. The jury, however, brought in their verdict that she was of unsound mind since November 1, 1830, and the marriage was consequently dissolved.

Questions involving the testamentary capacity, or legal competency to make a last will and testament, are those which, perhaps, the most frequently arise for investigation in courts of justice. The execution of a will is not unfrequently one of the last acts of life, and its provisions are seldom of a character to meet the views of all the expectants. Hence the disposition, so frequently manifested, of calling in question the legal capacity of the testator.

A will is the legal declaration of a man's intentions of what he wills to be performed after his death. *Nuncupative* or *unwritten wills*, both in this state and in England, are of no validity unless made by a soldier, while in actual military service, or by a mariner while at sea. In all other cases wills are required to be in writing.

No particular form of words is necessary to constitute it. The construction given to it, is that which carries out, the most effectually, the intentions of the testator, which are to be gathered from the whole instrument taken altogether.

In this state, the will is executed by the testator's signing it at the end of it in the presence of two witnesses, declaring it to be his last will and testament, asking them to sign it as attesting witnesses, and they, at his request, signing their names as such witnesses, and also stating their respective places of residence. Many points relative to what constitutes a legal mode of executing a last will and testament will be found discussed and decided in the case of *Remsen and another vs. Brinkerhoff and others*, 26 *Wend. Rep.*, 325.

A valid will cannot be executed by an infant, an idiot, or a person of insane memory. The diseases which are the most likely to invalidate a will, or to throw a doubt over the testamentary capacity of the testator, are all lethargic and comatose affections, whether arising from an internal cause, or an external injury. The effect of these is to suspend the intellectual faculties. Apoplexy also produces the same effect, and in case of recovery the patient is often left in a state of imbecility. Phrenitis, delirium tremens, and those inflammations which are accompanied with delirium, also impair the mind. 1 *Beck's Med. Juris.*, 637.

It is often a point of extreme difficulty to decide where an individual's disposing capacity really terminates. Apoplexy, hemiplegia, phrenitis, delirium tremens, and all other diseases affecting primarily the brain or organs of mind, are, in their nature, disqualifying only so far as they actually impair or destroy the power of manifesting the mental faculties. The fact of their existence, therefore, either previously or at the time a will is executed, should have no other effect than to induce a suspicion of incapacity, and thus lead to a more strict investigation of the real situation of the party.

There is another class of diseases not primarily affecting the brain, but expending themselves upon other organs, such, for instance, as the pulmonary consumption, which furnish but slight, if any, presumption that the mental powers suffer any degree of diminution. In fact the very reverse frequently occurs, these powers appearing brighter, more active, more energetic, as the sources of life in the organism are wasting away; as if while the one was returning to its kindred dust, the other was awaking to a higher life.

Many cases have occurred in which great difficulties were presented. In *Bennett's case*, cited *in* 9 *Vesey*, 186, *Shelford on Lunacy*, 179, Lord Chief Justice *Eyre* stated to the jury that the point was, whether the testator *knew perfectly what he was doing*, at the time the will was executed.

In *Ingram vs. Wyatt*, 1 *Haggard's Ecclesiastical Reports*, 384, the court, *Sir John Nicholl*, remark that mental imbecility seems to proceed from want of quickness, activity and motion in the intellectual faculties; that sometimes different faculties are found failing in different persons; that the memory is sometimes perfect where higher powers of the understanding are greatly defective; that in an individual of imbecile mind the understanding has made little progress with years; that it has not matured and ripened in the usual manner; that in such a case, unless the imbecility be extreme, by help of memory, imitation, habit, some improvement may take place, some progress in knowledge made, so that ideas may be acquired, facts, circumstances, places, and hacknied quotations recollected, and the individual will even conduct himself orderly and mannerly, make a few rational remarks on familiar and trite subjects, retain self-dominion, spend his own little income in providing for his wants, as a boy spends his pocket money, and yet may labor under great infirmity of mind, and be very liable to fraud and imposition.

Sir John Nicholl appears to have well understood the leading characteristics of the imbecile mind. The principal marks and features of imbecility, he remarks in the same case, are the same which belong to childhood, varying in degree in different individuals. That these are frivolous pursuits; fondness for, and stress upon, trifles; inertness of mind; paucity of ideas; shyness; timidity; submission to control; acquiescence under influence, and the like. Hence these infantile qualities have acquired for this species of deficiency of understanding, the name of childishness. The effect is, that where imbecility exists at all, and in proportion to its degree, it becomes necessary, especially in a case exposed to other adverse presumptions, to ascertain its extent with some accuracy, to see how far the individual was liable to be controlled by influence, to submit to ascendency, to acquiesce from inertness and confidence in those acts, upon the validity of which the court has to decide.

In a case in 8 *Massachusetts Rep.*, 372, the court instructed the jury, "that if they should think that the testatrix, at th time of dictating the will, had sufficient discretion for that purpose; and that, at the time of executing the will, she was able to recollect the particulars she had so dictated, they might find her of sound disposing mind and memory at the time of executing."

Swinburne says, "if a man be of a mean understanding, neither of the wise sort, nor of the foolish, but indifferent, as it were, betwixt a man and a fool; yea, though he rather incline to the foolish sort, so that, for his dull capacity, he might worthily be called grossum caput, a dull pate or a dunce; such an one is not prohibited to make a testament," and again, "it is said that old age is of itself no incapacity, unless it produce mere childishness, or idiocy, as where the testator forgets his own name."

In *Van Alst. vs. Hunter*, 5 *John. Chan. Rep.*, 148, the validity of a will made by a person between ninety and one hundred years of age was contested. The chancellor there says, "it is well understood that age alone will not disqualify a person from making a will, provided he has a competent possession of his mental faculties. The law looks only to the competency of the understanding; and neither age, nor sickness, nor extreme distress, or debility of body will affect the capacity to make a will, if sufficient intelligence remain. The failure of memory is not sufficient to create the incapacity, unless it be quite total, or extend to his immediate family and property. The Roman law seemed to apply the incapacity only to an extreme failure of memory, as for a man to forget his own name. The want of recollection of names, the chancellor observes, is one of the earliest symptoms of a decay of the memory, but this failure may exist to a very great degree, and yet the solid power of understanding remain.

The case of *Clarke* vs. *Fisher*, 1 *Paige*, 171, is important as involving the question of weakness of mind, and also the practice of fraud and imposition. That was the case of a will made by an old man of about eighty years of age, who, for about four years previous to his death, had been paralytic and mostly confined to his bed, his speech being much impaired. About three years before his death, he was married to a sister of his first wife, in whose favor, shortly before his death, he made the will in question; at first giving all his property to his wife, but subsequently, in the same will, giving one-fourth after the death of his wife to a supposed daughter of his deceased brother, Lawrence Fisher, who, it was shown, was imposed upon him as his niece, and the other three-fourths to the heirs of Eleanor Clark, Maria Clark, Ann Smith, and Isaac Rapelye. The Chancellor set aside the will, and remarks that "the general principles of law in relation to the capacity of a person to make a will, are well understood. He must be of sound and disposing mind and memory, so as to be capable of making a testamentary disposition of his property with sense and judgment, in reference to the situation and amount of such property, and to the relative claims of the different persons who are, or might be, the objects of his bounty." The validity of the same will was also the point in controversy in the case of *Clarke et al.* vs. *Sawyer et al*, which was sustained by the Assistant Vice-Chancellor of the first circuit, see 3 *Sandf. Rep.*, 351, but on appeal, was reversed by the Chancellor, from which an appeal was taken to the court of appeals. The same cause there will be found reported in 2 *Comstock's Reports*, 498. in which the decree of the Chancellor is affirmed, and on the same ground, viz., that it was obtained through undue influence. At the same time, the doctrine contained in the cases of *Stewart's Executors* vs. *Lispenard*, 26 *Wend.*, 255, and *Blanchard* vs. *Nestle*, 3 *Denio*, 37, hereafter mentioned, was referred to and adopted.

The provisions of the will itself are regarded, as furnishing no small amount of evidence in relation to testamentary capacity. Swinburne says, "If a lunatic person, or one that is beside himself at sometimes, but not continually, make his testament, and it is not known whether the same were made while he was of sound mind and memory or no, then in case the testament be so conceived, as thereby no argument of phrenzy or folly can be gathered, it is to be presumed that the same was made during the time of his calm and clear intermissions, and so the testament shall be adjudged good; yea, although it cannot be proved that the testator useth to have any clear and quiet intermissions at all, yet, nevertheless, I suppose that if the testament be wisely and orderly framed, the same ought to be accepted for a lawful testament." This reasoning has always exerted a very strong influence in all adjudications relative to the testamentary capacity—a "rational act, rationally done," presuming its source to be rational.

Along with the nature of the act, should also be considered its attendant circumstances, such as the situation of the testator at the time; who were his associates; by whom he was surrounded; to what influences he was subject; whose interests he has favored; and what have been the relations existing between him and those so favored.

We have already seen that a will will not be set aside on the ground of imbecility in the testator, if the party knew perfectly what he was doing when it was made. The best evidence of this, is instructions in reference to the provisions of the will, coming from the testator himself. If these cannot be proved, the defect may possibly be remedied by showing that something passed at the execution tantamount to instructions; or, if that be incapable of proof, then to show subsequent recognitions of its provisions of a clear and decided character. The suggestion made by Mr. Taylor in reference to this is worthy of attention, viz., that if a medical practitioner is present at the time the will is executed, he can easily satisfy himself of the state of mind of the testator, by requiring him to repeat from memory the way in which he has disposed of his property. If, upon such request, he repeat the leading provisions of the will correctly, he may be presumed to have understood himself while making, or directing the provisions to be made. *Taylor's Med. Juris.*, 512. In case no suspicion of fraud exists, a will consistent with previous affection and declarations, and supported by recognition and circumstances showing volition and capacity, is valid, though made in extremis, or at the very termination of life, and though the instructions were conveyed through the party benefited. 1 *Hagg. Eccl. Rep.*, 227.

So, also, it has been held that the clearest and most consistent evidence of capacity and volition is required to support a codicil conveying bequests of such extent as to be irreconcilable with the character of the deceased, and with her intentions, as proved by her affections and former testamentary dispositions; and where the deceased, at the time of its execution, was in a state of extreme weakness and debility, all her confidential friends being excluded or absent, and those only about her who were benefited under, or engaged in, the preparation or execution of the instrument. 1 *Hagg. Eccl. Rep.*, 256.

A case was tried in Northampton, Massachusetts, in 1848, in which the only question was the capacity of one of the attesting witnesses to a will. It was the case of *Oliver Smith's Will*, reported in 4 *Vol. American Journal of Insanity*, 226. The heirs at law claimed that Theophilus P. Phelps, one of the attesting witnesses, was in a state of mental alienation at the time of its attestation, and, therefore, that there had not been a compliance with the provisions of the statute. The sufficiency of the defence, admitting it to be established, was fully conceded, but the point at issue was whether it was made out. The jury sustained the will, finding the attesting witness competent.

The law admits a testamentary capacity, where there exists a degree of mental imbecility that would incapacitate for the transaction of ordinary business. In 3 *Wash. C. C. R.*, 587, Judge Washington says, "The capacity may be perfect to dispose of property by will, yet very inadequate for the management of other business; as, for instance, to make contracts for the purchase and sale of property." "It is sufficient, if the testator has such a mind and memory as enable him to understand the elements of which a will is composed, the disposition of his property in its simplest form."

The question as to what constitutes a legal capacity to make a will, was the most extensively discussed and clearly settled in the great case of *Stewart's Executor* vs. *Lispenard and Others*, decided in the Court of Errors of this State, and reported in 26 *Wendell*, 255. The point in controversy in this suit was the validity of the will of *Alice Lispenard*. The ground upon which it was claimed to be invalid was, that during her whole life, she labored under such a degree of *imbecility of mind* as to incapacitate her from making a valid will. The surrogate decided against its validity, refusing to admit it to probate. On appeal to the circuit judge of the first circuit, the surrogate's decree was affirmed. The Chancellor on appeal affirmed the same decree; and from the decree of the Chancellor an appeal was taken to the Court of Errors. The references to authorities, discussions and decisions in this case are all deeply interesting, and it is probably a case that best settles the lowest amount of capacity necessary to the making of a last will and testament. The facts were very numerous, and may be found on reference to the case, and also an abridged statement of them in *Guy's Principles of Forensic Medicine*, 291, *et seq.*

The doctrines essentially established in this case may be laid down to be the following:

1. The right of testamentary disposition of property is a natural right, and not a mere institution of positive law. It is subject to the restrictions and regulations of civil legislation, but is not its mere creature.

2. That a man's capacity may be perfect to dispose of his property by will, yet inadequate for the management of other business; as, for instance, to make contracts for the purchase and sale of property.

3. That affirmative facts prove the existence of mind; and, when that is once shown, the negative go to show only its defects and weakness, not its entire deprivation. That a wise man does not always show reason, a fool never.

4. That imbecility of mind in a testator will not avoid his last

will and testament. That idiots, lunatics, and persons *non compos mentis*, are disabled from disposing of their property by will; but that every person not embraced within either of these classes, and not laboring under any particular disability, as infancy, &c., is competent to make a will, be his understanding ever so weak. That in passing upon the validity of a will, courts do not measure the extent of the understanding of the testator, and that if he be not totally deprived of reason, whether he be wise or unwise, he is the lawful disposer of his property, and his will stands as a reason for his actions.

5. That the principle upon which the incapacity to make contracts and transact ordinary business mainly rests is, that those acts are held to be void, not on account of the general and positive disability of the party to perform all similar acts, but because the whole transaction, with its accompanying circumstances, including, of course, the fact of mental imbecility, evinced that his *consent* was wanting to the *particular act* the subject of adjudication.

6. In the case of the will of a person of imbecile mind, a *want of consent* by the testator to a *particular will* may be urged from his inability to comprehend its effects and nature; from the dispositions of the property being contrary to what naturally might have been expected from the relative situation of the parties; the preferences, partialities, and former testamentary declarations of the testator; the absence, at the making of the will, of those to whom he commonly looked for advice; and generally from the surrounding circumstances, into which the court called upon to pass upon the validity of the will will look with vigilance. And so, on the contrary, evidence of the general knowledge and understanding of the testator that he is the owner of property, and has the power of disposing of it by will; of his previous declarations and intent as to its disposition; of his gratitude and attachment to the donee for long and persevering care and kindness; and the will itself being in a simple form, intelligible to the plainest mind, will be sufficient to justify the court to pronounce it a genuine and valid instrument.

Substantially the same doctrine, in regard to the mental capacity sufficient to make a will, has since come under the review of the Supreme court in the case of *Blanchard* vs. *Nestle*, 3 *Denio*, 37, and was adopted and applied by the court in that case.

LEGAL CONSEQUENCES OF MANIA:

The principle upon which exemption from legal liability here rests, is entirely different from that we have just been considering. There may be here no lack of intelligence; no want of intellectual power to comprehend the law to which obedience is required. The difficulty consists not in the inability to understand, but to obey. It lies not in a deficient intellect, but in an erroneously directed or perverted will.

LEGAL CONSEQUENCES OF INTELLECTUAL MANIA:

When a maniac commits a trespass upon the person or property of others, the law renders him amenable in damages to be recovered in a civil action. *Weaver* vs. *Ward*, *Hobart's Rep.*, 134.

The same question has recently arisen in this State, in the case of *Krom* vs. *Schoonmaker*, 3 *Barbour's Supreme Court Reports*, 647. It is there decided by Harris, Justice, that a lunatic cannot be punished for a crime, but he may be prosecuted for an injury done to another; that he is not a free agent, capable of intelligent, voluntary action, and therefore is incapable of a *guilty intent*, which is the very essence of crime; but that a civil action, to recover damages for an injury, may be maintained against him, because the *intent* with which the act was done is not material.

The principle upon which this distinction rests, reaches to the measure of damages in a civil action. Where the *intent to injure* is established, the jury may take that into consideration, and give severe exemplary damages. But a maniac has, in strictness, no will, and hence the only damages that can be properly claimed against him, is the mere compensation of the party injured.

The legal consequences of general intellectual mania, are easily ascertained and settled. The prevalence of mania, or deranged and perverted action of the intellectual faculties generally, must necessarily be productive of those insane delusions or hallucinations, that entirely unfit the individual from basing his conduct upon the ordinary principles of human action. The distorted view which the intellect then takes of things; the intermingling and confounding together of relations; and the assumption of, and action upon, fancies for facts, all have the effect to disqualify the individual from enforcing his rights, or performing his duties, as a citizen or a subject. The commonly received principles of human action affect not him. He is a being by himself, acting upon assumptions having no existence except in his own mind, and in accordance with principles unacknowledged by his race. The law, therefore, wisely takes him from his own guidance, and while it divests him of his rights, releases him also from his duties. It allows him the use, but not the abuse, of his property; and holds him irresponsible for any aggression upon life, because he is wanting in those elements of accountability which must be possessed in order to constitute crime. The legal mode of determining incapacity by issuing, executing, and returning a commission, has already been considered.

The cases of difficulty that have presented themselves are those of partial intellectual mania, in which the derangement exists on one or a few topics, leaving the operations of intellect sane upon every other. We apprehend the true principle to be, that whether partial intellectual mania does, or does not, invalidate an act, must depend upon the connection of the act with the peculiar derangement; that where the act proceeds from, or is intimately connected with, the insane delusion, the actor is irresponsible, because in respect to such an act, he has ceased being a free moral agent.

Courts of justice have shown a reluctance to the admission of this principle. It presented itself in the case of *Greenwood*, *Ray's Medical Jurisprudence of Insanity*, 238; *White* vs. *Wilson*, 13 *Vesy's Rep.*, 88. He was a maniac of intelligence, having been bred to the bar. In the delirium of a fever, he received a draught from the hand of his brother, and immediately entertained the delusion that his brother had given him a potion with a view to destroy him. He recovered from the fever, but never from the delusion. That morbid idea ever afterwards haunted him, and in the will which he subsequently made, he disinherited his brother. The question arose upon the validity of the will.

A verdict had been obtained in the Court of Common Pleas against the will, but the judge strongly advised the jury to find the other way, and they did accordingly find in favor of the will. Subsequently, further proceedings took place, which finally resulted in a compromise.

The same kind of question arose in the case of *Johnson* vs. *Moore's heirs*, 1 *Little's Rep.*, 371, in Kentucky. The point in question was the validity of the will of George Moore, which was made by him in 1822, and shortly before his death. About four years previously, he had a dangerous fever, during which he imbibed a strong antipathy against his brothers, imagining they intended to destroy or injure him, which was entirely without foundation. This antipathy continued ever afterwards, with the exception that at one time he made a will in their favor, but afterwards cancelled it. The will he left executed, gave all his property to others, he declaring to one of the witnesses that they had endeavored to get his estate before his death.

The court set aside the will, remarking that the testator could not be accounted a free agent, in making his will, so far as his relatives were concerned, although free as to the rest of the world.

In the case of *Dew* vs. *Clark*, 3 *Addams' Reports*, 79, the question of partial intellectual mania, or its effect upon the mind of a testator, was extensively discussed. The testator, a man of intelligence, a surgeon and medical electrician, left a personal estate of nearly £40,000, bequeathing to the complainant, a daughter and only child, a life-interest in a small portion of it, bestowing the most of it upon his nephews. He had managed his pecuniary affairs, and conducted his business, in a rational and successful manner, but was shown by the daughter, from an early period of her life, to have manifested towards her an insane aversion. The particulars given, leave no room for doubt but that he was laboring under a complete delusion in regard to her character. The court, Sir John Nicholl, considering it fully proved that the will was the direct, unqualified offspring of the morbid delusion concerning the daughter, pronounced it to be null and void in law.

In 2 *Pothier on Obligations*, *Appendix*, 24, is laid down, as we suppose, the true doctrine, by Mr. Evans, the translator: "I cannot but think," says he, "that a mental disorder operating on partial subjects, should, with regard to those subjects, be attended with the same effects as a total deprivation of reason; and that, on the other hand, such a partial disorder, operating only on particular subjects, should not, in its legal effects, have an influence more extensive than the subjects to which it applies, and that every question should be reduced to the point, whether the act under consideration proceeded from a mind fully capable, in respect to that act, of exercising free, sound, and discriminating judgment; but in case the infirmity is established to exist, the tendency of it to direct or fetter the operations of the mind, should be in general regarded as sufficient presumptive evidence, without requiring a direct and positive proof of its actual operation."

In accordance with these views, the rule or principle to be followed in reference to any act, is—

1. To establish the delusion, which must be entertained as true, and must be false in fact:

2. To trace the act in question directly to the delusion, either as being actually produced by it, or so intimately connected with it as to lead to the presumption that it never would have occurred had not the delusion existed.

It has been made a question by many, whether the rule should be so restricted; whether the necessity should exist, of connecting the act with the delusion, in order to render it invalid.

Lord Erskine, in his speech in the case of Hadfield, before referred to, states that when delusion is entertained, it can be set up in avoidance of a civil act, although entirely unconnected with it. So also it has been urged, and with a considerable degree of force, that a mind insane upon any subject or topic, is unsound; that it becomes utterly impossible to know how extensive is the circle embraced within the insane action; that in many cases, the delusion itself is constantly changing, and hence its character must be undefined, and its influence unascertainable; that our knowledge of the insane mind is at best extremely imperfect, and hence where the sources of thought are delusive, our judgment in relation to the sanity of any act may well be doubted. Our experience certainly justifies the conclusion, that a partial insanity, consisting in derangement on one subject or topic, is likely to lead to a more general form of mania; the circle of insane influence continuing constantly to enlarge, until it comes to embrace the entire mental action. When we consider, in addition to all this, that the laws of association are perverted or annulled through the insane influence; that all the operations of mind, in the least degree tainted with delusion, are withdrawn from the empire of cause and effect, and beyond the limits of all rational estimate or calculation, it is certainly a reasonable doctrine that every act of such a mind, whether traceable to the delusion or not, should be regarded with doubt and suspicion. It may, however, well be doubted, whether in view of our present state of knowledge of the insane mind, a sounder rule can be adopted than the one already mentioned.

The effect of partial intellectual mania upon the contract of marriage, has been made a question. This kind of contract differs from others, in being vague and undefinable; in giving rise to rights, duties, and obligations, which can be but little known or appreciated until the occasions occur, out of which they arise. Many harmless delusions may undoubtedly be entertained which might not tend to render the individual less able or competent to perform the duties demanded by the marriage state. Any delusion connected directly with the idea of marriage, would probably invalidate the contract. So also would delusions of such a nature or character as to give rise to a course of conduct inconsistent with the duties and obligations growing out of that relation.

An anonymous case in 4 *Pickering's Rep.*, 32, consisted in an application for a divorce on the ground of insanity in the wife, at the time of marriage. The proof was, that she was subject to dejection of mind and singularities of conduct. The court said they felt bound to require such evidence of insanity, as in a civil action would justify the jury in finding a party incapable of making a contract, and that the fact of a party's being able to go through the marriage ceremony with propriety, was *prima facie* evidence of sufficient understanding to make the contract.

In the case of *Browning* vs. *Reid*, 2 *Phillimore's Rep.*, 69, Sir John Nicholl lays down the doctrine directly the reverse of this, stating that "going through the ceremony was not sufficient to establish the capacity of the party; and that foolish, crazy persons might be instructed to go through the formality of the ceremony, though wholly incapable of understanding the marriage contract."

In a similar case, Lord Stowell (then Sir William Scott,) remarked, that much stress was not to be laid on the circumstance that the party had manifested perfect propriety of behavior during the ceremony, as persons in that state will nevertheless often pursue a favorite purpose, with the composure and regularity of apparently sound minds.

The partially insane should clearly be divested of no right which he can exercise with safety to himself, or those around him. It is not every kind of delusion or hallucination that can justify the law in taking from a man his property, and placing him under the care and custody of a committee. It should be one which, if acted upon, would be likely to prove injurious to himself or others; or destructive to his property. It must, however, be admitted as true, that no man laboring under any delusion, can be considered perfectly safe. It is impossible to predict the course it may take, or the changes to which it may be subject. In all cases, therefore, the individual should be watched, however slight or trivial may be the delusion under which he labors.

Where the testamentary dispositions are such as indicate that they are founded on motives that might be supposed to govern a sane mind, and no insanity is apparent in them, they ought not to be disturbed, although the mind may be laboring under some degree of derangement.

The effect of delusion upon criminal responsibility has already been considered. Hoffbauer has made an ingenious suggestion in relation to the measure of this responsibility. He proposes that the delusive idea shall be considered as true, and that the individual shall be regarded and judged, as if he were really placed in the circumstances in which he imagines himself to be. Thus, if he is deluded with the idea that he is commanded by the Supreme Being to destroy the life of a human being, and destroys it in obedience to that command, he must be justified, because had he really been so commanded, it would have been his duty to have done so. On the other hand, if, on the receipt of a trivial injury, the individual, under the influence of a delusion originating from, or connected with, the injury, destroys life, he should be held responsible, because the injury, if truly received, would not justify the act.

It is obvious that such a principle can never be acted upon in criminal jurisprudence without being guilty of monstrous injustice to the insane. A man really deranged, who, under the influence of delusion, destroys life upon the receipt of a small injury, is no more the master of himself in that act, than if he had done it under a supposed command of the Almighty. The error of those who adopt the reasoning of Hoffbauer, consists in applying to the action of the insane mind, the same tests, and the same rules of judgment, which are applicable to the sane. Those in the slightest degree acquainted with the action of the insane mind, well know, that the practical effect of such a rule would be, in almost every case, to withdraw from the maniac that protection which the law, for wise reasons, has thrown around him.

Legal Consequences of Moral Mania:

Irresponsibility in moral mania rests on a different principle from that of intellectual. There is here no delusion, no false assumption of fancies for facts. The intellectual faculties may remain undisturbed in their operations, while the moral are exhibiting every variety of derangement. This, it is true, seldom occurs; as extensive derangement of the moral powers is commonly accompanied with some perversion of those of the intellect. Nevertheless, as the one set of faculties is independent of the other, there exists the possibility of their separate derangement.

As the moral powers embrace the motives, impulses and promptings to action, the derangement of one or more of them must seriously affect the volition upon which the act depends.

Actions are volitions carried to their extremest limit. They take place when nothing is wanting to render the volition complete, and they are themselves its most perfect evidence. Without the proof they furnish, there is no accountability to human law; as man can be accountable to God only for the volitions he forms in his own mind, but leaves unexecuted. The principle of forming volitions, and of carrying them out into acts, must be fully possessed to render a being accountable. When, therefore, the first is necessarily rendered incomplete, or the last prevented by some insurmountable obstacle, all accountability is destroyed. It is in the first only that we witness the agency of moral mania. It is a disturbing element thrown into the very sources whence volitions are derived; and either contributes, in large measure, to the formation of those that would otherwise remain unformed, or prevents the formation of others that would otherwise be formed. In either way, it disturbs the ordinary normal operations of mind, and thus absolves it from accountability.

It is not easy to define in what respect this new element modifies the volition or the act. The enquiry in relation to the former is unnecessary, except so far as it qualifies the latter. In regard to the manner or respect in which it modifies or affects the latter, so as to absolve from its consequences, there can never be expected an entire agreement among writers, or thinkers, or even the decisions of judicial tribunals.

I have supposed we might find in *irresistibility* a principle upon which all might agree. That whenever this quality should be found attached to an act, so far as to control it, the actor, in respect to such act, should be deemed irresponsible.

Without moral liberty, there can be no responsibility for crime. In the normal, sane state of the faculties, this enters as an essential element. In the deranged state of the moral faculties, where the sources of impulse, motive, and feeling are perverted and deranged, this liberty is destroyed, and with it the accountability for actions.

Irresistibility, where it arises from deranged or perverted action, should absolve from all accountability, because—

1. The act is unavoidable, and the actor therefore no more a subject of punishment, than a machine for going wrong when some part of its machinery is out of order. To administer punishment under such circumstances, would shock all the moral sympathies of men.

2. One of the purposes of punishment could never be answered by it, viz., the reformation of the criminal. If the act be irresistible, the whole effect of punishment upon the individual must be lost.

3. Another of the purposes of punishment would remain equally unanswered, viz., the salutary effect to be produced by it upon the minds of others. That effect, instead of being salutary, would be in a high degree injurious, as it would shock all moral sensibilities, and create a horror of the law itself which could thus needlessly sacrifice life without answering any good end or purpose.

But suppose this principle admitted, another grave subject of enquiry presents itself, viz.: How is it to be applied in practice? What are the tests of irresistibility? By what indications is it attended, and how is it established in proof? Little direct evidence can be expected; and the indirect, is unfortunately less clear and conclusive than it ought to be. It is gathered principally from the nature of the act itself; the circumstances under which it took place; the things and events that preceded and succeeded it; the presumed influences that were brought to bear upon the actor; and the agreement or contrast existing between the act and the entire course of conduct of the individual.

This question the most frequently arises in cases of homicide, where the plea of insanity is interposed as a defence. In such, it usually presents great doubt and difficulty, and creates embarrassments not easily overcome.

The circumstances under which the act was done will come in for a fair amount of consideration. If it were in open day, in a public place, in sight of witnesses, it would appear more like insane impulse, than the secret movements of the criminal. The impulse, it is true, might act in private as well as in public; so that the negation of these should not be regarded as conclusively proving it the act of a sane mind.

If a case of homicide, the relations existing between the parties are worthy of much consideration. If the person slain were a parent, a child, a wife, or some near friend or relative, and no particular cause for the act was assigned, it might raise a fair presumption that it was due to insane impulse. If the individual slain be an object merely of indifference, towards whom no peculiar feelings either of friendship or enmity can be presumed to be entertained, the presumption, although much less strong, is still in favor of its being an insane act. The mere motiveless destruction of life can with difficulty be regarded as the act of a sane mind. If, on the contrary, a motive exist, or if feelings of enmity, originating in no delusion, be entertained towards the person slain, the presumption will be that it is a sane act.

It will also be proper and necessary that enquiries should be instituted into the things and events that have preceded, and may succeed the act. There may have been previous derangement, or some symptoms of cerebral disease. So also there may be subsequent derangement, the very act itself being an explosion of mania, which may be succeeded by clear evidence of insanity.

The particular influences that may be brought to bear upon the individual should also be enquired into. The sight and proximity of murderous weapons have been known to excite to fearful activity the destructive propensity. Favorable opportunities for accomplishing the act, have been at times laid hold of for that purpose. So also contradiction, sudden and unfounded disgust, or some trivial, insignificant, and even imaginary circumstance, has aroused that propensity to terrible activity.

In some instances, the monomaniac is fully aware of his malady, and begs to be restrained, so as to be rendered incapable of doing an act which he knows to be wrong, but which he feels to be unavoidable. In some cases, after doing it, he makes a voluntary confession, and gives himself up to the proper authorities. In others, he takes to flight, and if apprehended, denies it.

Dr. Ray, in his work on the *Medical Jurisprudence of Insanity*, *pages* 225, *et seq.*, § 189–90, lays down some principles that may be adopted in doubtful or difficult cases. The criminal never acts without a motive. It may be the avoidance of some personal inconvenience; it may be the acquisition of property; it may be the gratification of revenge. It is always to accomplish some selfish object. The monomaniac acts either without a motive, or upon one so glaringly inadequate, as to be itself evidence of derangement. With the criminal, death is, therefore, simply a means, by which he seeks to accomplish some ulterior end; with the monomaniac, it is entirely divested of that character, and becomes the end in view, or that which must be so regarded in a sane mind. Hence the criminal never sheds more blood than is necessary for the attainment of his object, while the monomaniac often sacrifices all within his reach, to the cravings of his destructive propensity.

The criminal always lays plans for the execution of his designs. Time, place, and weapons, are all suited to his purpose. The monomaniac may do the same, but seldom or never, unless he is acting under the influence of some delusion. The pure homicidal monomaniac consults none of the usual conveniencies of crime. His act is the act of a moment, regardless of time, place, or witnesses.

The criminal often has accomplices; always vicious associates. The monomaniac neither. In the real criminal, there is deliberation; a cool, collected, and often judicious selection of time, place, weapon and circumstance. In the monomaniac, if unaccompanied with delusion, these are all wanting..

Another leading line of investigation is the correspondence of the act with all the previous acts and conduct of the individual. Insanity, as generally understood, consists in a perverted faculty, consequent upon a diseased organ. The insane act, therefore, should stand out in strong contrast with all the previous acts done or attempted by the individual. If such prove to be the fact; if, when held up and examined in connection with the great context of existence, it stands alone, unsustained and unsupported by any other of a similar character, it certainly furnishes strong evidence of derangement. Unfortunately, if found to correspond in character with previous acts, it cannot always be regarded as clear proof of sanity. A propensity may have been originally strong, but the organ healthy; and hence, although the calls for gratification may have been clamorous, yet they were controllable. Those calls, however, may have been frequently obeyed; indulgence has only added to the original strength, until the propensity is pushed beyond its normal, healthy state, and becomes perverted, deranged, and irresistible. In such a case, the act will compare well with all the previous acts of life. While, therefore, we might regard the disagreement as affording proof of derangement, yet in case of agreement, we ought not to rest equally clear in a contrary conclusion, but to resort to other indications and sources of proof.

The subject of moral mania seldom arises for legal investigation except in the administration of criminal law. The tests here adopted, have been already considered, and it is, therefore, unnecessary again to advert to them.

The Legal Consequences of Delirium:

Questions of doubt and difficulty often arise in regard to the legality of acts, contracts, and wills, done, made, and executed in a delirious state. Febrile delirium incapacitates, not so much by weakening the powers of mind generally, as by deranging their regular functional operations. Delirium, as we have already seen, is usually but a symptom of some other disease, and almost universally, an acute one. The establishment of its existence, during any part of the disease, throws a doubt over all the contracts entered into subsequently, and during its continuance. That doubt may be dissipated by clearly showing the fact of a lucid interval at the time the contract was made. The same strength of proof will not here be required to establish the fact of a lucid interval, as the law renders necessary in the case of mania. The character of the delirium, in reference to its being temporary or permanent, will be a material subject of inquiry. When merely temporary, and only of occasional occurrence, a less amount of proof will be required.

Thus in the case of *Brogden* vs. *Brown*, 2 *Addams' Rep.*, 441, the last will and testament of a widow which was executed on the evening of the day previous to her death, her disease being acute, and of ten days continuance, on the last two or three of which, she was more or less delirious, was contested on the ground of a want of testamentary capacity. The medical testimony was divided on the subject, but the attending physician attributed the delirium to the paroxysms of severe pain suffered by the deceased, it being scarcely perceptible when these were absent, and he believed that in the intervals she had perfect capacity. It also appeared that the will had been prepared from instructions received from her; that it was read over to her, and was subscribed by her in the usual form, with a dash below.

Its validity was established; Sir John Nicholl very justly observing, that "in cases of permanent, proper insanity, the proof of a lucid interval is a matter of extreme difficulty, and for this among other reasons, namely: that the patient so affected is not unfrequently *rational* to all *outward* appearance, without any real abatement of his malady; so that in truth and substance, he is just as insane in his apparently rational, as he is in his visible raving fits. But the *apparently* rational intervals of persons merely delirious, for the most part, are *really* such. Delirium is a fluctuating state of mind, created by temporary excitement, in the absence of which, to be ascertained by the *appearance* of the patient, the patient is, most commonly, *really* sane. Hence, as also indeed, from their greater presumed frequency in most instances in cases of delirium, the probabilities, *a priori*, in favor of a lucid interval, are infinitely stronger in a case of delirium, than in one of permanent, proper insanity; and the difficulty of proving a lucid interval is less, in the same exact proportion, in the former, than it is in the latter case, and has always been so held by this court."

Questions involving the legal consequences of delirium seldom, if ever, arise in the administration of criminal justice. Neither can they be said to be frequent in matters of contract or other common business transactions. The muscular debility, and great reduction of physical energy, which usually accompany the disease, of which the delirium is a symptom, place the patient in a position extremely unfavorable for the performance of any action. It is in the execution of last wills and testaments that questions of this character generally arise, and here very puzzling questions frequently present themselves.

In the decision of these questions, involving the testamentary capacity, the nature of the act itself, together with its attendant circumstances, are to be principally regarded. "If it be agreeable to instructions or declarations previously expressed, when unquestionably sound in mind; if it be consonant to the general tenor of his affections; if it be consistent and coherent, one part with another; and if it have been obtained by the exercise of no improper influence, it will be established, even though the medical evidence may throw strong doubts on the capacity of the testator. On the contrary, when these conditions are absent, or are replaced by others of an opposite description, it will as generally be annulled, however plain and positive may be the evidence in favor of his capacity." *Ray's Med. Juris. of Insanity*, 305, § 261.

In the case of *Evans* vs. *Knight and Moore*, 1 *Addams*, 229, the testator made his will on the 21st, and died on the 24th of April, of an attack of pneumonia, during the latter stages of which he had considerable delirium. A physician who saw him on the 21st testified that he was not in a state of sound mind, memory, and understanding, or capable of doing any act requiring the exercise of thought, judgment, and reflection. Another who saw him on the 23d thought it extremely improbable that he should have been free from wandering and mental affection on a day so shortly before he saw him as the 21st. He, however, gave instructions for a will, without any suggestions from the legal adviser who reduced them to writing, and approved and subscribed them after they were read to him. He also, while giving instructions, appeared rational, and conducted with propriety. The testamentary capacity was held to have been sufficiently made out.

Those interested in looking at authorities on this subject may refer to *Cook* vs. *Goude and Bennett*, 1 *Haggard*, 577; *King and Thwaits* vs. *Farley*, *Ib.*, 502; *Waters* vs. *Howlett*, 3 *Haggard*, 790;

Bird vs. *Bird* 2 *Haggard*, 142; *Martin* vs. *Wotton*, 1 *Lee's Eccl. Rep.*, 130; *Bittleston* vs. *Clark*, 2 *Lee*, 229; *Marsh* vs. *Tyrrel*, 2 *Haggard's Eccl. Rep.*, 84; *Hoby* vs. *Hoby*, 1 *Haggard*, 146.

In some head affections, the patient is in a comatose state, from which he may be roused to apparent consciousness for a short time, so as to recognize persons and answer questions; but he soon subsides into a state of sleep. In such cases, the testamentary capacity does not exist. So, also, in case of an injury to the head, the patient, after rallying from its immediate effects, may answer questions rationally, appear collected and intelligent, and yet, at the same time, remain so utterly unconscious, that in subsequent times he recollects nothing of it.

A case is mentioned by *Dr. Ray*, *page* 301, § 257, quoting it from Dr. Woodward, of a legal gentleman who, in the course of an acute pneumonic affection, began to have slight delirium on awaking in the morning, but it was observed at no other time. At this period of time, he requested his physicians to apprise him if they considered his case dangerous, as he wished to alter his will which had been previously made by him. They did not consider him in much danger, but it was thought advisable that he should make the alteration, and he did so. He recovered, and some months after, found this altered will among his papers, and had not the slightest recollection of ever having made it, and was much dissatisfied with its dispositions, as great injustice was done by them to two of his sons. This should certainly induce a caution against deciding too hastily in favor of the testamentary capacity.

LEGAL CONSEQUENCES OF SUICIDE:

The English common law appears, by its provisions, to have entertained a great horror of suicide. The man who had perpetrated self-murder was deemed a felon, and his goods were forfeited to the crown. He was denied christian burial; but, without any funeral ceremony, was interred in a four-road-way, with a stake passed through the body. These severities induced juries very generally to regard the act as itself evidence of mental derangement.

The law of England still treats suicide as a felony, unless the fact of derangement is established. Those, therefore, who have attempted its commission and failed, are treated as sane and responsible agents. Insanity, as in any other case, may be interposed as a defence, but is not to be presumed.

In the case of the *Queen* vs. *Rumball*, see *Taylor's Med. Juris.*, 520, the prisoner was charged with attempting to drown her child. She had fastened the child to her dress, and threw herself into a canal, with the intention of committing suicide. She was rescued, and tried and convicted of attempting to murder her child by drowning.

In the case of the *Queen* vs. *Gathercole*, same reference as above, a man was charged with manslaughter under the following circumstances. The prisoner threw himself into a canal, for the purpose of drowning himself. The deceased, who was passing, jumped in and rescued him, but was himself drowned in the humane attempt. The defence was that the prisoner was insane, and therefore irresponsible. This was negatived, and he was convicted. So a man attempting to shoot himself, accidentally shoots another, is held responsible for it, unless insanity is shown.

Suicide, in its medico-legal relations, possesses, at the present day, but little interest beyond the bearing it may be deemed to have on mental alienation. It may be either a sane or an insane act, and the difficulty lies in distinguishing the one from the other. It may be resorted to in order to escape disgrace or ruin, and a lesser evil of the two, in which case it would be the act of a sane mind ; or it may proceed from delusion, or from a sudden irresistible impulse, in either of which cases it would be the result of insanity.

Under the head of suicidal monomania, many circumstances are mentioned going to show that there are many things in common between the suicidal tendency and mental alienation, leading to the conclusion, that very frequently the one was only a form of the other. A fact is mentioned in the 18th Report of the Superintendent of the Hartford Asylum, see *Guy's Principles of Forensic Medicine*, 315, which further shows its connexion with general mania. Of the *fifty-six* discharged cured, *eleven* strongly manifested the suicidal propensity, scarcely a moment, day or night, passing, but they seemed intent upon killing themselves; and some did not refrain from attempting it even in the presence of their attendants. The means resorted to were strangling, wounding, starving, throwing themselves from windows, and endeavoring to obtain poisons. Yet these all finally recovered, and were among the most perfect recoveries ever witnessed.

The cases which have presented the greatest difficulty have been those in which a will was made a short time prior to the commission of the act; and where, therefore, the effect of the act upon the will became necessarily involved in the decision. In such, if the act was the result of insanity, then it would still remain to be investigated whether that insanity was of such a character as to destroy the testamentary capacity. The possession and exercise of that capacity is perfectly consistent with the existence, at the time, of some forms of mental alienation. If no delusion clogs or misguides the judgment, and no frenzy controls the will, a mind possessing ordinary power, or even less, may exercise the testamentary capacity.

The course which courts have deemed it the safest to take, in cases of this character, is to inquire into the previous conduct of the testator, and to examine the provisions of the will. If those provisions are such as to indicate the exercise of sense and judgment, the will will be sustained.

In the case of *Burrows* vs. *Burrows*, 1 *Haggard's Eccl. Reports*, 109, the act of suicide was committed three days after the execution of the will. As no insanity was shown at the time the instructions for drawing the will were given, Sir John Nicholl decided in favor of its validity.

In the case of *Brooks and Others* vs. *Barret and Others*, 7 *Pickering's Reports*, 94, Chief Justice Parker held that suicide, committed fifteen days before the execution of the will, was not sufficient, in the absense of other evidence, to prove him insane, and thus invalidate the will.

If the provisions of the will are unreasonable, or inconsistent with the previous declarations of the testator in reference to them, the commission of suicide shortly after its execution will be regarded as one of the evidences of a want of testamentary capacity.

LEGAL CONSEQUENCES OF SOMNAMBULISM:

It must be seldom that this condition of mind comes up for investigation in courts of law. It may incapacitate an individual from the performance of the duties required by his situation, and thus impair the validity of contracts to which he may be a party. It may, if concealed at the time of entering into them, annul contracts of service, as it may render the individual troublesome, mischievous, and even dangerous.

As the acts, while in that state, are done unconsciously, none can properly be imputed as crimes; although for wrongs done to others, the individual would probably be held accountable, to the same extent, and on the same principle, as in the case of the lunatic.

LEGAL CONSEQUENCES OF DRUNKENNESS:

As there are different degrees of drunkenness, it is obvious that the same legal rule should not have an equal application to all cases that may arise. In the first stage, where there is merely excitement and preternatural activity of the faculties, although the rapidity of their movements may prevent all deliberate thought, and produce a confusion of ideas, yet the law cannot exempt the individual either from civil or criminal responsibility.

In the second stage, the senses are retained, although in an enfeebled state, but the judgment and memory, if exercised at all, are so only in the slightest possible degree. He has no idea of the consequences of his actions; realizes little, if at all, the relations in which he stands to others; and is awakened to unbounded rage on the slightest provocation. In such a state, it is obvious he can no more be responsible for his acts than he is for his drunkenness. In the last stage, he is entirely divested of reason, and no longer conscious of his external relations.

In settling the extent of legal liability which attaches to these lower degrees of drunkenness, it becomes necessary to decide the important question, how far an individual is answerable for acts done in such a state or condition as must excuse the acts themselves, but which state or condition has been voluntarily induced. This question has been very differently settled among different nations. The Grecian law awarded a double punishment for a crime committed under the influence of inebriation, not only punishing the crime, but also the drunkenness that gave rise to it.

The Roman law allowed the plea of drunkenness in exculpation for acts committed under its influence, except in the case of women, and those it punished capitally. In the French penal code no mention is made of drunkenness, but the highest French tribunal has decided that drunkenness being both voluntary and reprehensible, could never constitute a legal or moral excuse.

In Austria, under the code of 1803, drunkenness is made a ground of exculpation from responsibility when not voluntarily induced for the purpose of committing the crime. The German jurisprudence takes substantially the same view. In France, England and Scotland, a different principle has prevailed.

In France, as early as the reign of Francis I., an ordinance was made declaring that drunkenness shall, in no case, absolve from the ordinary punishment of crime. The present penal code is silent on the subject, but the court of cassation, the highest judicial tribunal in the kingdom, has decided that drunkenness, being a voluntary and reprehensible state, could never constitute a legal or moral excuse. *Ray's Med. Juris. of Insan.*, § 392-3.

The common law of England, in early periods, regarded unfavorably all attempts to set up drunkenness in exculpation or avoidance of any act. "A drunkard, who is, *voluntarius demo*, hath no privilege thereby, whatever ill or hurt he doth, his drunkenness doth aggravate it." *Thomas' Coke's Littleton*, 46. The principle proceeded upon, and which many regard as unsound, is that because the act of drinking is voluntary, therefore the person is responsible for whatever actions it may lead him to commit. An act, therefore, which is entirely unintentional, is visited with the same consequences with one that is intentional. But the law, it should not be forgotten, regards the act of drinking as in itself reprehensible, and purely voluntary. It, therefore, lends the weight of its sanctions against the act, by refusing to permit its consequences to be mitigated or modified by it.

The rule of law, however, varies according to the nature of the act. A civil act is visited with different consequences from a criminal one. Courts of equity early interfered to relieve against acts done, and contracts entered into, while in the drunken state, where they were procured by the fraud or imposition of the other party. 1 *Story's Equity Jurisprudence*, §230; 3 *Pier. Will.*, 130, *note* (*A.*) In order to lay a foundation for affording such relief, it was long required that the contrivance of the other party, in effecting the intoxication, should be a necessary element. This would be evidence of fraud and imposition, and hence would avoid it on the application of him upon whom it was practiced.

It may now, however, be regarded as settled, that drunkenness itself, however induced, when so excessive and absolute as to suspend the reason, is a complete defence to a contract entered into while in that state. The parties do not contract on equal terms. The one has no consenting mind. It can, however, be ratified in the sober state, being voidable, and not absolutely void. *Story on Contracts*, §27; *Kent's Com.*, 2, *p.* 451; *Pitt vs. Smith*, 3 *Camp.*, 33; *Burratt vs. Buxton*, 2 *Aiken's Vermont Rep.*, 167; *Dorr vs. Munsell*, 13 *John. Rep.*, 430.

A criminal act is regarded differently. To such, the law will never allow drunkenness to be interposed as a defence. It may possibly in mitigation of sentence, and perhaps reduce the class of the particular offence. *Story on Contracts*, §28; *Pennsylvania vs. McFall*, *Addison's R.*, 257; 1 *Russell on Crimes*, 11.

Under this head comes also to be considered the legal responsibility for criminal acts done while laboring under *delirium tremens*. This is a remote result of drunkenness, but characterised by most of the elements that constitute the active forms of mania. This question arose in the case of *Drew*, tried for the murder of *Clark*; see 3 *American Jurist*, 7-9; 5 *Mason's Rep.*, 28; *Ray's Med. Juris. of Insan.*, §403-4. Mr. Justice Story in that case says: "The question made at the bar is whether insanity, whose remote cause is habitual drunkenness, is, or is not, an excuse in a court of law, for a homicide committed by the party while so insane, but not at the time intoxicated or under the influence of liquor. We are clearly of opinion that insanity is a competent excuse in such a case. In general, insanity is an excuse for any crime, because the party has not the possession of his reason, which includes responsibility. An exception is, when the crime is committed while the party is in a fit of intoxication, and while it lasts; and not, as in this case, a remote consequence, superinduced by the antecedent exhaustion of the party arising from gross and habitual drunkenness. Had the crime been committed when Drew was in a fit of intoxication, he would have been liable to be convicted of murder. As he was not then intoxicated, but merely insane from abstinence from liquor, he cannot be pronounced guilty of the offence. The law looks to the immediate, and not to the remote cause, to the actual state of the party, and not to the cause which remotely produced it." The jury acquitted the prisoner.

Another instance in which this condition of mind became a subject of medico-legal enquiry was in the case of *Theodore Wilson*, who was tried for the murder of his wife, in York county, Maine, in 1835. The facts are reported in *Ray's Medical Jurisprudence of Insanity*, §405. He was acquitted on the ground of insanity.

In another case, that of *John Birdsell*, see *Ray's Med. Juris. of Insanity*, §406, this condition of mind came up for adjudication in the supreme court of Ohio. The prisoner had delirium tremens several times, and on this occasion had been drinking so freely as to become intoxicated some three days before the act was committed. He labored under several hallucinations, one of which was that his wife was in combination with three of his neighbors, and that they had conspired to take his life. He fancied that these were in the loft manufacturing ropes to hang him, and would go up, and come back pretending to have in his hands their fragments, having cut the ropes to pieces. He killed his wife in the evening, by striking her on the head with an axe. When taken he manifested no compunction for the act; said he knew he should be hanged for it; that he ought to have done it nine months sooner, and evinced no dread of punishment for his crime, but still continued to be in great apprehensions from the persons who, he believed, had intended to kill him. The question submitted to the jury was, whether the prisoner was capable of discriminating between right and wrong. They found that he was, and accordingly returned a verdict of guilty. The punishment was commuted by the governor to that of imprisonment, but previous to the commutation, he became permanently insane.

The general principle extracted from these cases, and which may now be considered as forming a part of American jurisprudence, is, that where the jury are satisfied that the criminal act was committed in a state of insanity, that is to exempt from its legal consequences, whatever may have been the cause that produced it : That the legal consequences of insanity are the same, whatever causes may have been in operation contributing to its production.

Cases of great difficulty sometimes occur, in which an individual has formerly received some injury, as a blow on the head, or has been afflicted with some disease of the brain, which has left that organ in a very irritable condition, and liable to be seriously affected by very slight causes. Under such circumstances, drunkenness will often produce a temporary madness, which will continue only during the drunken fit, leaving the mind in the possession of its usual sanity. It is asked whether insanity is here to be urged as an excuse, the act being perpetrated while under the immediate effect of intoxicating liquor. There are instances of soldiers, who have received wounds in the head, and who well know from experience that excesses in drinking will render them mad. What shall be the rule adopted in such cases? The high authority of Judge Story sustains the position, that insanity is not a competent excuse for crime, if it be committed while the party is in a fit of intoxication, and while it lasts.

This principle is illustrated in the case of McDonough, who was indicted and tried for the murder of his wife, before the supreme court of Massachusetts, in 1817. *Ray's Medical Jurisprudence of Insanity*, § 398. Some years previous to the commission of the act, he had received a severe injury of the head, in consequence of which there occurred occasional paroxysms of insanity, although his mind was generally sane and clear. These were often produced by intoxication, although they sometimes took place without any apparent exciting cause. In one of these fits of insanity, induced by drinking, and while actually under the influence of liquor, he murdered his wife.

The court, in charging the jury, observed, "that if they believed the prisoner was in a fit of lunacy when he committed the act, he should be acquitted; but if they believed he was of sound mind, or, if his reason were impaired, that it was caused by intoxication only, the fact being proved, and no palliating circumstances existing, he must be convicted." The prisoner was found guilty.

This seems to have been a case in which the act was very clearly traced to a pathological condition of the brain, and this should have formed "a palliating circumstance" in exoneration. The very thirst for liquor itself may have been the result of morbid action in the brain, induced by this pathological condition. Alison, in his Principles of the Criminal Law of Scotland, page 654, makes the following sensible remarks: "If either the insanity has supervened from drinking, without the panel's (the prisoner's) having been aware that such an indulgence in his case leads to such a consequence; or if it has arisen from the combination of drinking with a half crazy or infirm state of mind, or a previous wound or illness which rendered spirits fatal to his intellect, to a degree unusual in other men, or which could not have been anticipated, it seems inhuman to visit him with the extreme punishment which was suitable in the other case. In such case the proper course is to convict; but in consideration of the degree of infirmity proved, recommend to the royal mercy."

The laws of New-York, and several other states, provide for the care and custody of the person and estate of an habitual drunkard in the same manner as in case of lunatics. Nor is the committee discharged, and the property restored, without proof of a permanent reformation. The amount of proof required must be in a great measure dependent on circumstances, but as a general rule a voluntary refraining from the use of intoxicating drinks for at least one year immediately preceding the application will be required. 3 *Edward's Rep.*, 380.

CLASS IV.

This class includes all questions arising out of deceptive practices, and these may all be summed up in the general topic of

FEIGNED DISEASES.

This subject presents certainly a matter of curious enquiry. It is curious to observe the power achieved by some individuals over their own organization. It is no less curious to notice the agents and instrumentalities they have discovered, or become possessed of, having the power to produce in their material systems the appearances or indications of disease; their ingenuity and adroitness in turning to the best account all such agents and instrumentalities; and the extent of change they are capable of effecting in different parts, or in their entire systems, by a simple effort of volition.

The utility of occupying much time or space in the discussion of this subject may well be doubted, as, with a few exceptions, the medical profession are seldom called upon in this country to decide upon the feigned or real character of the disease. In Europe it is much more necessary to understand this subject. The great source which furnishes the occasion from which far the greatest number of feigned diseases have arisen is the military service.

The large standing armies constantly kept on foot by the different powers of Europe have done a violence to human nature by merging the man into the soldier. We might naturally expect that all the possible means which art could invent, or ingenuity devise, would be here put in requisition to effect an escape from so unnatural a bondage. Accordingly we find Foderè observing of his own nation, at the time when conscription was in full force there, that the art of feigning diseases was then brought to such perfection as to "render it as difficult to detect a feigned disease, as to cure a real one." Fortunately we are almost entirely exempt from this great political evil, which brings in its train so many moral and physical evils. There are nevertheless occasions in which diseases are and will continue to be feigned among us, although they are fewer in number and less frequently resorted to. One instance is the mendicant, who hopes to be enabled by means of it to live on in habits of idleness, and to have his necessary wants supplied by an appeal to the benevolent feelings of the liberal. Another is the criminal, who resorts to them with the view of avoiding all liability for crime. So also the desire of gratifying revenge has sometimes furnished the motive for feigning, and injuries actually received may be greatly aggravated in appearance for the purpose of recovering heavier damages.

Zacchias has laid down five general rules which are extremely judicious, and are some or all useful in detecting all feigned diseases whatever be their kind or character.

1. The first rule is, that the physician must in all suspected cases, ascertain from himself or his relatives and friends what are his physical and moral habits; what the state of his affairs; what the peculiar nature of his connexions with others, whether he is in danger of the infliction of some punishment, or of being tried for the commission of some crime; in fine he should cautiously make all those enquiries likely to throw any light upon the motive by which he is actuated.

2. The second rule is, to compare the disease suspected to be feigned, with the causes capable of producing it; such as the age, temperament, and mode of life of the individual. Many, probably most, diseases do not supervene without having furnished some previous indications. Great changes in the system are almost always gradual. The occurrence, for instance, of a dropsy immediately succeeding a state of excellent health, would be an anomaly never witnessed. In all cases, therefore, where a disease is suddenly induced without any previous change or preparation of the system, there should be strong suspicion entertained that the will of the individual has had more or less agency in its production.

3. The third general rule is founded upon the aversion of per

sons who are feigning diseases from resorting to the proper remedies. This may arise not alone from a dislike of the medicines themselves, but from a desire to delay the using of any means which would create in others an expectation that a cure would be effected by them. Aversion to medicines may be experienced in cases of real disease, but it never will be likely to be, to any great extent, where a severe pain is present.

4. The symptoms should be closely scrutinized, with the view of determining whether they are, in reality, such as should properly belong to the disease. Patients are not supposed to be as thoroughly cognizant with all the symptoms that attend upon, and indicate a particular disease as physicians are. Hence where artifice is suspected, an ingenious physician may often lead the patient into a detail of symptoms, many or even most of which are entirely inconsistent with the disease he is attempting to feign.

5. The fifth, and last direction is, to follow the course of the complaint, and attend to the circumstances which successively occur. Thus no case of local inflammation can very long exist without affecting the general system, inducing a preternatural action in all its parts, and resulting in a more or less severe state of feverish excitement. It requires a much more profound knowledge than that ordinarily possessed to enable an individual to exhibit the symptoms of a disease as they should successively occur, even admitting they possessed the power. This remark, however, applies more particularly to those diseases that have successive steps or stages, each one following another in regular gradation.

All diseases are not feigned with equal ease and facility. In some the symptoms are established with a great degree of certainty. These can rarely all be exhibited, certainly not in their natural order of succession, either from lack of knowledge or lack of power or both. There are some also in which it is the nature of the disease to work great changes in the system, in which the excretions and secretions are affected in a very perceptible manner, and such it is hardly possible to imitate. There are others variable and uncertain in their symptoms, and attended with little or no change in the external appearance, such, for example, as insanity and epilepsy. In these cases, and in all such as make the physician dependent for the results he arrives at, on the statement given him by the patient, the difficulty in detecting is much greater, and the result arrived at less certain.

In some works treating extensively on this subject, there is a classification of diseases the most generally imitated. I shall content myself with citing a few instances of the diseases the most commonly imitated with the means of imitating them, and the methods of detection, which, with the exception of insanity, are taken mostly from Dr. Beck.

FEVER may be induced by the use of various stimulants, such as wine, brandy, cantharides, &c. A feverish state of the system may be created by violent exercise, and then the cold fit imitated. Dr. Cheney mentions that he once found a soldier apparently in the *chill* of an intermittent, *shaking violently*, but on throwing off the bed clothes he found him not in the *cold*, but in the *sweating stage*, caused by his exertions.

No feigning of fever can be sustained for any length of time, as a continued resort to the stimulants for that purpose would, of itself, result in the production of real disease. As fevers are usually produced by some active stimulating agent taken into the system, it can often be detected in the secretions, or in the contents of the stomach or rectum, evacuated by emetics or cathartics A case is mentioned by Dr. Hutchinson, where the vomiting, by its smell, disclosed that tobacco had been taken. In the same case, the pulse was extremely small and rapid, and the tongue was covered with a brown coating the eighth of an inch thick, which, on being removed, was found to be common brown soap. In another case, the tongue was made to exhibit a dry white appearance, by rubbing it with whiting obtained from the wall. Chalk, pipe-clay, brick-dust, and flour have all been used to give the tongue an appearance indicating fever.

The appearances and symptoms of CONSUMPTION are sometimes attempted to be produced by creating emaciation by abstinence and drinking vinegar, and by mixing up expectoration with pus obtained from others, tinging it with blood from the gums. A discriminating prolonged examination of the case will generally detect it.

Diseases of the Heart are sometimes feigned, and their frequently attending symptom, interruption or derangement of the pulse, is produced by the application of ligatures for that purpose. So, also, the pulse may sometimes be suspended by pressure on the artery. In one case, the physician was equally unsuccessful in finding his patient's pulse at the right or left wrist, but finally detected him, whenever his pulse was to be examined, suspending it by pressing his finger on the artery under the arm-pit.

The appearance of *aneurism*, or of some other serious derangement of the circulating system, has been produced by ligatures. In one case, a ligature was bound tightly round the neck, and so very fine as to be almost entirely hid by the folds of the skin. The countenance was much swollen and livid, but on the removing of the ligature, the alarming symptoms were soon found to disappear.

The functions of the heart have also been deranged by a resort to agents taken internally. The powder of white hellebore taken in large quantities, causes vomiting, purging, syncope, tremors, and great nervous irritability, followed by great and inordinate action of the heart and arteries, and which, in its turn, is succeeded by great debility, or a disposition to paralysis. In smaller doses, it is usually productive of disorder of the stomach and violent and continued palpitations.

Pain, under some one or more of its numerous forms, is very frequently feigned. The natural language of pain is so easily learned, that it may be often feigned with tolerable success. The forms under which it is very frequently simulated are those of rheumatism, lumbago and sciatica.

Pain in the external parts is less frequently feigned than in the internal. In the former, it is also usually accompanied with heat, redness, change of color or tumor, which renders its simulation difficult. Gout and rheumatism are sometimes feigned, but their regular symptoms, such as redness in the one, and tumefaction or diminution of size, with retraction or loss of motion in the other, render detection often easy.

There are, however, some kinds of pain, such, for instance, as the scorbutic, in which no external appearances indicate its existence. In all such cases, the difficulty of detection is much greater. Although the natural language of pain may, for a time, be imitated with tolerable success, yet a close and careful observation, and that particularly at times when the individual is not apprised of it, will generally succeed in detecting the imposition. The internal pain of any large organ or viscus is almost uniformly accompanied by symptoms which unequivocally denote its existence. Thus, severe pain in the head, thorax or abdomen, is attended with a set of symptoms peculiar to each case, all of which it may be difficult or impossible to imitate. Pain in the head is accompanied with a loss of sleep, a fever, and, if it be very severe, with delirium. These complicated results cannot be easily imitated.

Inquiry should be made into the nature of the pain, whether it is throbbing, darting, or constant; what has been its duration, and what is its alleged cause. It is hardly possible for severe pain to be of long continuance without effecting a derangement, more or less permanent, in the system. It is advised by Dr. Beck, if there is much suspicion of the reality of the pain, to mix a little opium with the patient's food, and observe whether sleep be readily induced by it. As opium has not the same effect upon every constitution, its operation cannot be assumed as an infallible test. The state or condition of the patient during sleep, however induced, should furnish some indications as to the reality of the complaint. The presence of violent pain is not consistent with a calm, quiet, long continued slumber. Satisfactory experiments may often be made during sleep to test the actual existence of pain, more especially that which is internal. A soldier complained of a severe pain in the abdomen, and screamed on the slightest approach of anything to that part. About midnight, the medical attendant found him fast asleep. It required considerable pressure and even kneading of the abdomen before his slumber could be disturbed.

An appeal to a strong mental aversion has sometimes proved successful in effecting sudden cures. Dr. A. T. Thompson mentions a case in which a feigned *tic doloureux* was suddenly cured by recommending to rub the part affected over the back of a dog, an animal against which the patient entertained an inveterate antipathy. This, at the time, was supposed to be owing to the strong influence of the mind over the action of the nervous system, but was, eight years afterwards, admitted by the patient to have been a deception.

Hœmoptysis may be feigned by pretending to cough and then spitting out the blood created by pricking the gums ; or red paint may be held under the tongue that would tinge the saliva of a red color. The patient should be made to spit without coughing, in which case the saliva would still retain its red color.

A vomiting of blood has been sometimes feigned, to effect which the blood of some animal has been drunk, or some colored liquid used, and then thrown up in the presence of spectators.

Bloody Urine has been feigned by adding blood to the excretion, or by using substances that have the quality of reddening it, such as the prickly pear, the beet root, madder, &c. A very good test is to subject the bloody urine to the action of heat, and in real cases a brown coagulum will be formed.

Great Weakness is feigned by using substances to make the face appear pale and livid. In such case, the state of the appetite should be inquired into, and the pulse and skin examined. Great emaciation has been produced in a short time, by sucking a copper cent in the mouth and swallowing the saliva.

Diarrhœa may be excited by a mixture of vinegar and burnt cork, or a solution of sulphate of iron. *Vomiting* may be produced at will by some persons, simply by pressure on the abdomen. Others produce it by swallowing air. The vomiting of *undigested food* is suspicious. It may be induced by a diseased stomach ; but the continuance of a good appetite, and the absence of emaciation, afford good evidence of the health of that organ.

Paralysis of the superior and inferior extremities is often feigned. A single limb is sometimes pretended to be affected by it. A swelling of the extremity, in cases of pretended paralysis, is sometimes produced by ligatures. Electricity and the actual cautery will generally be found effectual in their application to pretended cases.

Epilepsy is a disease often feigned. In suspected cases, it should be observed whether the symptoms that usually accompany real epilepsy, such as a livid face, a fixed pupil, a pale lip, a distorted and frothy mouth, an altered pulse, dullness of sensation, vertigo, and great weakness, are all or most of them present. The symptom altogether the most available in detecting deception, is the obtuseness and almost entire want of feeling that characterizes it. Foderè relates the case of an artillerist, who was such an adept in deceiving as to elude all his means of detecting except the application of fire, and this always recovered him. One curious fact is connected with his confession, which is, that he never counterfeited a paroxysm without feeling, for several days afterwards, a violent pain in the head. De Haen, in a case submitted to him, suspected deceit, and as it subsequently appeared truly so, from the following circumstances. During the paroxysm, the eyes were opened in a natural manner, and not with a wink; the pulse was natural; when the curtains were drawn, the pupil of the eye was dilated, and when opened, contracted, and the contraction occurred very violently when a candle was presented. The following means have been resorted to for the purpose of detection, viz.:

To blow snuff into the nostrils:

To dip flannel into hot water, and apply it to the side:

To pour a drop of alcohol into the eye:

To pour a small stream of water on the face:

To insinuate aloes and salt into the mouth.

The following circumstances are noticed under this head:

1. In real epilepsy, if the hands be forced open, they will remain expanded; in the feigned, they will immediately close again.

2. In real epilepsy, the contractions of various parts of the body always come on simultaneously. There is no regular period in the return of the fits.

3. In real epilepsy, warmth and perspiration are present during the fit; in the feigned, they succeed it.

4. In real epilepsy, there is concealment of situation; in the feigned, rather a desire of publicity.

The CONVULSIONS that are feigned are not attended with that stiffness and rigidity of the muscles with those that are real. Convulsions are difficult of imitation for any considerable length of time, because the antagonist muscles will soon come to exert a force which all the efforts of the imposter are unable to bear up against.

CATALEPSY is sometimes feigned. The following ludicrous anecdote will serve to explain something of the nature of it, and of the means of detecting it:

"A patient in the hospital feigned to be afflicted with catalepsy; in which disorder, it is said, a person loses all consciousness and volition, yet remains in the very attitude in which they were suddenly seized with this temporary suspension of the intellectual faculties. Mr. John Hunter began to comment before the surrounding students on the strangeness of the latter circumstance; and as the man stood with his hand a little elevated and extended, he said, you see, gentlemen, that the hand is supported merely in consequence of the muscles persevering in that condition to which volition had excited them, prior to the cataleptic seizure. I wonder, continued he, what additional weight they would support, and so saying, he slipped the noose of a cord round the wrist and hung to the other end a small weight, which produced no alteration in the position of the hand. Then, after a short time, with a pair of scissors, he imperceptibly snipped the cord. The weight fell to the ground, and the hand was as suddenly raised in the air by the increased effort which volition had excited for the support of the increased weight. Thus was it manifested that the man possessed consciousness and volition, and the imposture stood revealed." 1 *Beck*, 2–3.

SYNCOPE and HYSTERIA have sometimes been attempted to be feigned, but they cannot resist the action of sternutatories. The symptoms attending them are not easily dissembled. A small, feeble and languishing pulse, an almost suppressed respiration, cold sweats, coldness of the extremities, and paleness of the countenance, cannot generally be commanded at will.

There are on record some very extraordinary cases of SOMNOLENCY, in which there is the appearance of total insensibility for a long period of time. In this state, the application of the most powerful agents has been resisted for months. A very extraordinary case illustrating this is quoted by Dr. Beck from the Edinburgh Annual Register, 1 *Beck*, 24–5, which goes to show the very great power which the mind is capable of exercising over the sufferings of the body.

One Phineas Adams, a deserter, aged eighteen years, lay from the 26th of April, to the 8th of July, 1811, in a state of insensibility, resisting the action of every agent, as electric shocks, powerful medicines, &c. His eyes were closed, his countenance pale, his sustenance sucked in through his teeth; but his respiration was free, and his pulse of a healthy tone. Snuff was thrust up his nostrils, and pins under his finger-nails, to excite sensation, but all in vain. He even underwent the operation of scalping, to ascertain whether there was not some injury of the brain, and gave no sign of sensibility whatever during the operation, except the utterance once only of a groan, when the instrument was applied to scrape the head; and yet, after his discharge, the whole turned out to be an imposition.

The SCROFULA has been attempted to be imitated, by exciting ulcers in the neck and lips with euphorbium, or other acrid substances. It is not, however, possible to imitate the true scrofulous ulcer.

SCURVY has been feigned, by inducing a bleeding state of the gums by means of potash.

OPTHALMIA has been very extensively imitated. It may be artificially excited by the application of various stimulants. The rapidity of its progress generally detects it, as the acme is arrived at within a few hours after the application of the acrid substance. The substances so used have been principally salt, sulphate of copper, corrosive sublimate, cantharides, alum, tobacco juice, lime, and nitric acid. Deception in this disease has prevailed so alarmingly as to render it necessary to proclaim an ordinance declaring that no soldier should be discharged for the loss of one eye only.

The BLINDNESS produced by amaurosis has been often imitated. The pupils in this case are usually dilated and fixed. There are, however, some cases in which they retain their contractile power after the sight is lost. The patient should always be watched to see whether he does not avoid obstacles. Extract of belladonna or hyoscyamus, applied to the skin around the eye, give a dilated pupil and inactive iris. The eye, however, is always rendered more or less red from local applications; besides, the effects in such cases are always temporary.

DEAFNESS has sometimes been pretended, but this can generally be detected by close observation. Ordinary persons can never be expected to be always on their guard, and opportunities will, therefore, generally occur of detecting imposition. One conscript was detected by the general letting fall, intentionally, a small piece of silver behind him. He turned his head in the direction of the sound, and thus disclosed the fraud he was practicing. The sensation created by hearing an unexpected sound, can very rarely be successfully concealed.

There have been very extraordinary instances of those who have pretended to be deaf and dumb, and have successfully carried through, for a long period, the practice of the fraud. Foderê has found women more successful than men in the feigning of deafness and dumbness. A remarkable case of one Victor Foy is cited, who, for the space of four years, succeeded in eluding all that ingenuity could contrive, or artifice invent, with a view to his detection. So perfect had he become, that to use his own expression, when the fraud was detected, he had unlearned how to hear. After passing through every ordeal, and being found and announced in the public journals as actually deaf and dumb, he was guilty of the imprudence of stating in writing that he had been under the charge of the Abbe Sicard. That ingenious and penetrating individual immediately pronounced, from the writing itself, that the writer was not born deaf and dumb, for the reason that he wrote from sound, while the deaf and dumb write only from sight. A course of experiments subsequently adopted and followed up, resulted in a complete disclosure of the imposition.

If the tongue retains its muscular power, the pretension to dumbness is, in all probability, without any foundation.

Tumors and enlargements have furnished many occasions for feigning. In one case, a female had an abdominal enlargement which continued to increase for thirty-nine years, and excited so much commisseration and charity as to enable her to lead a very comfortable life. Great curiosity existed as to the cause of so singular a phenomenon. After her death, the tumor was found, not on her body, but in her wardrobe, in the shape of an immensely large sack or cushion, so made as to exactly fit the shape of the abdomen. From excessive modesty, she would suffer no medical man to examine her during life.

All the appearances of hydrocephalus have been caused by opening the integuments of the head near the vertex, and then introducing air between them and the muscles. Similar inflations, together with the appearance of the most hideous deformity, has been produced in a child by means of introducing air, and the application of ligatures to different parts of the body. So also the resemblance to a dropsy has been caused by inflating the parietes of the abdomen. Swollen appearances may also be produced very easily by the introduction of air into the cellular tissue, as that tissue is spread over the whole surface of the body, and a very small aperture serves for the introduction of the air. Ligaments applied to the lower extremities have produced the appearance of anasarca of those extremities. Ascites has been apparently caused by the injection of water into the cavity of the abdomen. Tympanites of the stomach, and great distention of the abdomen, have been produced by swallowing air.

Hydrocele has been imitated by means of injected fluids, or by the introduction of air through a small incision.

The appearance of Hernia has also been produced by inflation, and that so frequently, that a receipt for its production seems to have been current in the British army. Some men have been enabled to produce swellings resembling hernia, by retaining the testes in the groin, through the power they could exercise over the cremaster muscles.

An individual mentioned by Mr. Hutchison, possessed such perfect control over the testicles, that he could pull both together from the bottom of the scrotum up to the external abdominal rings, and again let them both drop together, or he could pull each separately, letting each separately drop; or one could be ascending while the other was descending, and that about as rapidly as the eye could follow them. 1 *Beck*, 38.

CONTRACTIONS and DEFORMITY, and consequent LAMENESS, have been often feigned, to effect some purpose, sometimes to increase the damages sustained from a trifling injury. Inaction, and the use of ligatures, may render the parts thin; or an effect is sometimes produced by maintaining particular joints for a long time in one position. The real nature of the case may sometimes be detected by close watching, without any appearance of suspicion. A resort may also be had to remedies. Electricity has often been found successful. An emetic, causing sickness, has resulted in the contracted limb's being found to yield to a very slight force. Those complaining of the contraction of one of the lower extremities, should be compelled to support themselves for some time on the healthy leg alone. The trembling and elongation of the other soon manifest the deceit. Feigned cases have also been detected by examination during sleep, by engaging them in interesting conversation, or by resorting to any means, so calculated to make them forget their situation as to let their limbs fall into a natural mode of action. There are, however, some extraordinary cases of deception mentioned; one particularly, of a convict who succeeded in convincing everybody that he had a bent knee, that disabled him from doing hard labor, for the period of seven years. But upon being discharged, one knee was found to be equally sound with the other.

ULCERS have been frequently feigned; or rather, an appearance resembling ulcers has been produced, by resorting to divers expedients for that purpose. Acetate of copper, quick-lime, the juice of euphorbium, or other acrid plants, have been made use of for the purpose of creating the appearance of ulcers, or of preventing real ones from healing. Irritation has been sometimes caused or kept up by rubbing the part, and thrusting pins through the bandages. False ulcers may generally be detected—

1. By examining their borders. They will be found to be less callous.

2. By examining their surfaces. They will generally be found more superficial than real ones.

3. They are less painful than real ones.

4. The nature of the discharge must be observed, whether it be pus or sanies.

5. The general habit of the patient must be attended to. If all the indications of health are present, ulcerous appearances may be suspected: And,

6. False ulcers may be easily healed, because there is no radical vice in the system, which has caused their production.

One singular mode of practicing deception by inducing disease, has been to insert a copper half-penny, or some copper substance, into a cut made for that purpose in the flesh, and leave it imbedded there. The penalty paid has been often severe, as it has resulted in the loss of the limb.

Even cancer has been sought to be imitated, but its detection will depend mainly upon the same principles as those that test the real or feigned existence of ulcers.

Wounds of many different kinds have been frequently feigned or resorted to for various purposes. Needles have been thrust into various parts of the body. In one case, no less than four hundred were removed from different abscesses in about three years.

Mutilations have been voluntarily made, and their detection has been a matter of great difficulty. The kind of mutilation the most common among the Roman soldiery was the cutting off the thumb; and the cutting off that, or some one or more of the fingers, has been often resorted to among the English and French soldiers, to obtain their discharge. The French soldiers, in some instances, even caused their teeth to be filed off or extracted, so as to render themselves unable to bite off the end of the cartridge.

In the case of voluntary mutilation, a close attention to the circumstances will frequently disclose the truth. Those who resort to it are not always observed to act upon the close connection subsisting between the cause and its effects. One, for instance, alleged that the amputation of two of his fingers was effected by the collision of water casks. The cuts, on examination, were found to be clean, and the amputation complete. Another complained of having lost his thumb by falling on broken glass, but there was no mark of abrasion whatever.

INSANITY, OR MENTAL ALIENATION, in all its varied forms, may be *feigned*, and this it is most important for the American medical jurist to understand. One reason of the reluctance with which courts of law entertain the plea of insanity in a criminal prosecution, is undoubtedly some apprehension lest it should prove to be feigned, and thus an imposition be practiced upon them. The entire immunity from punishment which Insanity carries along with it, creates a strong motive on the part of the criminal to feign it. Besides, the symptoms of real insanity are of so indefinite and equivocal a character, and some of them withal so marked, that according to the popular understanding of it, there is little difficulty in successfully imitating it. All these require that a very attentive consideration should be given to this very important subject.

The great mass of the people, including even those of very respectable intelligence, know no other kind of mental alienation than idiocy, the lower degrees of imbecility, and the active forms of mania, and more generally of intellectual mania only. They mostly regard it as consisting in general and indiscriminate raving, without any reference to object or end; as a letting loose of every faculty, in order that it might display its most intense and utmost workings. If this were really the fact, madness might be imitated by working up the mind into a state of intolerable frenzy, and thus exhibiting at will the extreme action of the faculties. But in the real disease, there is a certain method in madness, which without close observation remains unperceived, and which, therefore, the similator would fail to imitate. This method consists in the reference which all the ravings of the maniac have to some leading idea, which is predominant throughout, constituting usually the delusion or hallucination in which the disease consists.

Those who have had the amplest opportunities for observing the insane, unite in testifying that it is extremely difficult to feign insanity successfully, and that no attempts at such imposition can long be sustained. Georget, Haslam, and Conolly, all concur in this statement. All the different forms of insanity have their own peculiar characteristics, which are known and easily recognized by the experienced observer. Those who undertake to feign it are, in almost all cases, ignorant of these, and hence incapable of displaying it in its true colors.

In suspected cases, it would be well first to have reference to the motive that may have influenced the attempt at deception. Is there any good to be obtained, or evil to be avoided, by being insane at that particular time? Inquiry should be strictly made as to the time when the first insane indications appeared, and what were the circumstances that preceded or accompanied them? If a criminal act, were the indications prior or subsequent to its commission? The act may itself have been a consequence of insanity, or by its action upon the mind, it may so have unhinged its faculties, as to have produced the derangement. In either case, the insanity will probably have borrowed its hue from the crime, and allusion will frequently be made to it. This would probably be far from the case with the simulator.

It is a remark in which there is undoubtedly much truth, that imposters in almost all cases over act. Their opportunities for observing really insane exhibitions have probably been small, and hence their attempts at imitation will be defective. They act under the general impression that insanity is only another name for indefinite wildness, and that the greater the irregularity, strangeness, and utter singularity of their conduct and mental manifestations, the more likely they will be to accomplish the deception. The fact is generally overlooked, that it often requires much discrimination to detect the insanity, and that even in the case of the most raving mania, there are periods of time intervening between the paroxysms, in which there is little if any insane manifestation. During these intervening periods, the maniac remembers his friends and acquaintances; also has a recollection of places, dates, and events. There may be strange combinations of ideas, but they will generally have reference to the particular delusion present. This delusion may afford the clue by which their peculiar mental anomalies are explainable.

In simulated insanity, all these things are apt to be overlooked. The imposter is likely to take it for granted, that if he is incoherent, his perceptions erroneous, and his ideas regardless of truth, propriety, or proportion, he is thoroughly acting out insanity. Hence he will not perceive common qualities or ordinary relations; forgets friends and acquaintances; confounds names and places; jumbles together events; misremembers dates; in fact, trains his perceptive faculties to make false returns, in order that he may display greater wildness and irregularity. An instance of this occurred in the case of Jean Pierre, as given by *Dr. Ray*, *page* 337, *et seq.*, § 292–3.

It has been remarked, that in those cases that were simulated, there is a certain hesitation, and appearance of premeditation in the succession of ideas, however incoherent, very different from the abruptness and rapidity with which in real madness the train of thought is changed. This, to a practiced observer, is a strong source of proof.

Another great point towards which the attention should be directed, is the moral displays of the patient, and particularly such as are exemplified in the character of the feelings manifested towards those to whom he sustains the nearest and dearest relations. The effect of moral mania, either singly, or in combination with intellectual, is to create such a perversion of the moral feelings, as to implant enmity and hate in the very sources of love and affection; so that those objects which, in the sane state, are the most loved and cherished, become in the insane, the most hated and abhorred. This fact the imposter will not probably be aware of.

The plots and schemes of the really insane, so far as the intent to injure others is developed by them, almost uniformly have a direct reference to their nearest and dearest friends; while those of the imposter regard rather the persons with whom he is at enmity, or, at least, towards whom he is indifferent.

Another test is furnished in the almost entire disregard paid by the really insane to the decencies and proprieties of life. The perversion in the moral feelings naturally leads to a perversion in conduct, which results in outraging all the forms and fashions usually observed, and held almost sacred in the ordinary intercourse of society. This trait the imposter may fail to imitate, and his conduct in that particular should be closely observed.

Nor should the disturbance in the physical organization be overlooked. The wildness, and unsettled character of the eye; the peculiar cast of the countenance, and expression of the features; the evidences of febrile excitement, manifested by increased heat, and accelerated pulse, are all circumstances which, although not controlling, are nevertheless by no means to be lost sight of, in the determination of doubtful cases.

Another point of considerable importance to be noticed, is the sleeplessness that accompanies the disease. In cases of actual raving mania, this usually prevails to an astonishing extent; days, and sometimes whole weeks, passing on without the patient's experiencing any sleep whatever. The faculties being under the guidance of insane impulse, seem to be exempt from the ordinary laws to which, in a healthy state, they are subject. Action, intense and unceasing, impairs not their ability to act. They seem rather to gather fresh strength from exertion, and to be invigorated by the means that ordinarily exhausts. Not so, however, with the imposter. From the ordinary laws of mind, he can claim no exemption. To him, as to the rest of mankind, repose is necessary to gather the means for renewed effort. The extraordinary exertions rendered necessary to keep up a simulation of raving mania, cannot fail soon to exhaust the resources of the individual, and to render rest necessary to recruit his wasting energies. If carefully watched, he will not be found to prolong his sleeplessness and continued exertion beyond two or three days.

The really insane are far less susceptible than others to the operation of many medicines, such as purgatives, emetics, and opium. The last is frequently used in suspected cases. The simulator cannot resist the action of a strong dose of opium; while, on the maniac, it will have little or no effect.

Another point to which observation may be directed, is the causes and appearances that preceded the first occurrence of any well marked symptoms of the disease. Real insanity seldom if ever comes on suddenly. The outbreak or explosion may be sudden, but that is almost invariably preceded by what is termed the *incubation* of madness. There are a great variety of symptoms, such as singularities in ideas and conduct, that almost invariably precede the explosion. Few real cases occur without some previous indications having been furnished.

The simulator, on the contrary, is not apt to resort to previous training. His insanity is generally sudden—instantaneous. He takes by surprise. The faculties all at once jump from their regular modes of acting, into unlimited extravagance of manifestation.

Nor should the peculiarities and habits of the individual be overlooked. Habits of intoxication immediately succeeded by complete abstinence, may have given rise to something resembling the delirium tremens. A great degree of nervous irritability may possibly be sufficient to explain the phenomena presented. Careful enquiry should be made whether the ancestors of the individual have ever been afflicted with any form of mental alienation; or whether the individual himself, at any previous period of his life, had a similar affliction.

Another point towards which the attention should be directed, is the morbid irritability and sudden displays of violent passion, without any adequate cause, which characterize the really insane. There is an impatience of contradiction, and strong ebullition of passion occurring upon the most trivial circumstance, which are extremely difficult of imitation. The imposter cannot so easily vary his conduct. He cannot readily divorce the act from its motive, or reverse the ordinary relations existing between the force of the motive and the performance of the act.

Considerable stress is laid upon the bold, unflinching look of real maniacs, and the extreme difficulty attending its successful imitation. The imposter almost invariably shrinks from a keen, searching glance, and may also betray some emotion on being directly charged with the deception.

The observations thus far made, are more particularly applicable to general mania, as this is the form the most universally known, and the most generally imitated. Many of the tests already mentioned, apply to partial, as well as general mania.

As to partial mania, "its simulators," says Haslam, "are deficient in the presiding principle, the ruling delusion, the unfounded aversions, and causeless attachments which characterize insanity. They are unable to mimic the solemn dignity of characteristic madness, nor recur to those associations which mark this disorder, and they will want the peculiarity of look, which so strongly impresses the experienced observer."

With the simulator, there is an obvious anxiety to produce an impression, which contrasts strongly with the reserve and indifference of the real monomaniac.

The real monomaniac is extremely prejucided in favor of his own opinions, and impatient of the slightest contradiction; while the simulator readily overlooks this essential point, if the contradiction is skilfully managed.

Another point essential to be attended to, especially with those of naturally excitable temperaments, is to introduce the topic which embraces his delusion, and if the case be a real one, accelerated pulse, a flushed countenance, and evidence of excitement will be the result; while the simulator will remain unaffected.

Idiocy is sometimes attempted to be imitated, especially by those whose experience may have furnished them with opportunities of observing that form of alienation. The past history of the individual must here be referred to. Idiocy is either congenital, or has been produced by very obvious causes. If the history can be traced back to a period of intelligence, the case is not congenital, and enquiry must be made as to the causes that produced it. In cases of simulation, it will be difficult to find real causes adequate to the production of the effect, existing at the precise period of time when their agency would be required for that production.

There would be a serious difficulty with the most perfect imitator, in assuming the appearance, look, and bearing of an idiot. The stamp of genuine idiotism, no effort of mind can reach. The expressionless features; the vacant look; the unutterably stupid cast of countenance, characterizing simple idiotism, can proceed only from the absence, not the presence, of mind.

Imbecility is more easily feigned than idiocy. In real imbecility, there is a singular mixture of stupidity and shrewdness, which is difficult of imitation. The shrewdness of the simulator is generally displayed in those cases in which his own interest is concerned, and his stupidity, in things that do not concern him. When, therefore, his answers and statements are of such a character as to criminate himself, the case is probably a genuine one. But the conclusion should not be too hastily drawn that it is not such an one, if they have not that effect.

Senile dementia may be sometimes feigned. This, it must be recollected, proceeds from a deficiency of mental power and excitement. The simulator will be found to base his manifestations on excess of mental excitement. His delusions and hallucinations, and all his mental exhibitions, will indicate power and energy, and not the weakness that is attendant on senile dementia. They will partake more of the character of partial mania, than of this form of dementia. Instead of being characterized by weakness and childishness, they will be found to possess the elements of strength and energy.

It is suggested by Dr. Ray, to mention in the hearing of a person supposed to be feigning insanity, some symptom of madness which is easily imitated, as not being present. At a subsequent examination, if the derangement is feigned, this symptom will be very sure to be observed, whether it is or is not a symptom of madness.

CLASS V.

This class includes a brief consideration of the following topics, viz:

AGE; IDENTITY; PRESUMPTION OF SURVIVORSHIP; LIFE ASSURANCE; AND MEDICAL EVIDENCE.

I. AGE.

The only point of view in which I shall consider *Age*, is as affecting the question of *Identity*. The action of organic forces is so different in different individuals, and is dependent also upon so many different circumstances, that the changes which are common to all, cannot be relied upon as occurring at the same age. The period of puberty, for instance, depends upon climate, food, manner of life, and probably much upon the constitution itself.

As has been heretofore stated, the centre of the body, at birth, is at the umbilicus. In the adult, it is generally at the pubes; and for the intermediate ages, at intermediate points—nearer to the umbilicus in the infant, and to the pubes in those approaching the adult age. In the female, the lower extremities being shorter than those of the male, especially the thigh bones, the centre of the body will be found above the pubes.

The following generally mark the times of the appearance of the first set or milk teeth, those of the lower jaw preceding those of the upper:

The central incisors, in from five to seven months:

The lateral incisors, in from six to nine months:

The first molars, in from eight to fifteen months:

The canine teeth, in from fifteen to eighteen months:

The second molars, in from eighteen to twenty-four months.

The above can only be stated as general results. There is great diversity in individual cases.

The permanent set are very irregular in the time of their appearance They are not complete till the *dentes sapientiæ* appear. This generally happens from the eighteenth to the twenty-fifth year, but it is occasionally deferred to a much later period. One remarkable case is mentioned of a man of eighty, who died from the irritation produced by cutting his wisdom tooth.

As one of the signs of old age, the *arcus senilis*, or white line around the margin of the iris, has been mentioned; but the times of its appearance in different individuals are very various. All the other indications of age in the living, are more or less deceptive.

In the dead subject, age will be found to work many changes upon the osseous system. As old age increases the internal cavities of the bones increase, from the absorption of the osseous matter, and the bones will, therefore, become lighter. Those of the head are more solidly united, but the absorption of their diplœ renders them thin. The lower jaw becomes shallow; the alveolar processes are absorbed, and the angle again becomes obtuse as in childhood. The spinal column is also curved. The cartilages of the larynx and ribs are ossified. In children, the gelatine greatly preponderates in the composition of the bones. In youth, the gelatine and earthy matter are found united in about equal proportions. In old age, the phosphate of lime greatly predominates. Hence the osseous tissue is more dense, dry and fragile, abounding as it does in earthy materials. The heart and arteries are generally found to some extent ossified, in old age.

II. IDENTITY.

Questions of identity, relative to the living and the dead, are frequently occurring in courts of justice. There is one instance in which a jury may be empanelled to try the question of identity only, and that is where a prisoner after his conviction makes his escape and is re-taken. In the inquest of the coroner, the first step taken is to identify the body, or such remains of it as may be found.

In identifying the living, the testimony of medical witnesses is not often required, unless to explain the nature of deformities, or injuries, or some particular changes, designed to alter the external appearance. The following may be enumerated as some of the means by which, in a disputed case, the identity may be established or disproved :

1. Congenital marks or malconformations. These are of a permanent character, and, when well established, may always be relied upon.

2. Wounds, or injuries of the hard parts, as the bones. These, where the injuries are severe, will be likely to remain for long periods of time.

3. Wounds, or injuries on the soft parts. These leave behind them scars, the presence or absence of which may decide the question in controversy. In a case of bigamy, which came on for trial before Judge Livingston, in New-York, in 1804, the only question was one of identity : whether Joseph Parker, as he called himself, was really Thomas Hoag, under which name he was being tried. It was stated that Hoag had a scar on his forehead, a small mark on his neck, and that his speech was quick and lisping. All these peculiarities were found on the prisoner. It was, however, testified that Hoag had a scar under his foot, occasioned by treading upon a drawing knife. On examining his feet, *no scar was to be found on either of them.* 1 *Beck*, 516 ; *Guy*, 22.

4. Scrofulous ulcers leave behind them cicatrices, which are almost as permanent as scars. Small-pox and burns also leave their marks behind them.

5. The effect produced on the system by working at particular trades or professions, should also be carefully examined.

6. Form of face, cast of countenance, make of body, physiognomy, pathognomy, the consideration of all those many things that make up the idea of an individual. These are the most subject to change ; but they offer the most obvious and easily accessible means of judgment.

Long continued exposure to fatigue and hardship, and the action of depressing passions, will produce great changes in the individual. This was illustrated in the case of the Italian, Casali, who left his country at an early age, and returned after an absence of thirty years, and laid claim to his property which his heirs had appropriated to themselves. The judges were much perplexed and embarrassed, and finally consulted Zacchias as to whether the human countenance could be so changed as to render it impossible to recognize the person. He assigned several causes which might produce such an alteration; as age, change of air, aliments, the manner of life, and the diseases to which we are liable. The decision was finally given in his favor, the heirs failing to prove his death.

There are cases on record in which the hair has been suddenly changed from black to white in the course of a few hours. Mary, Queen of Scotland, is said to have afforded one instance, several other are also mentioned. *Guy*, 24. Violent and sudden emotion has also had the same effect. The hair may be changed by various agents. Charcoal and grease will change it from a light to a dark color. It may be detected by its soiling the fingers, or by putting a lock into boiling water. Litharge, chalk, and fresh lime, composing the *Tinctura Pompeiana*, changes the color from light to various shades of brown and black. So, also, black hair may be changed to various lighter shades, as to chestnut, blond and yellow, by being steeped or washed in solutions of chlorine, of different strengths, and during a longer or shorter time. In such cases, the chlorine is readily detected by its smell. These deceits are always easily detected by allowing the hair to grow for a short time, the individual not having access to these means.

In identifying the dead, the physician may be called upon to determine the age, sex, and probable stature of the party to whom the fragments belong; and also to notice any particular deformity that may serve as a means of identifying. Dupuytren identified the body of a murdered man chiefly by a malformation of the hip joint. A case in Edinburgh was decided by a dentist, who produced a cast of the gums which he had taken during life. In the late trial of Dr. Webster, in Boston, for the murder of Dr. George Parkman, the only evidence of any importance bearing on the subject of identity, was the testimony of the dentist, Dr. Keep. A block of teeth was found in Dr. Webster's laboratory, which, on being shown to Dr. Keep, he recognized as a set of teeth he had made for Dr. Parkman in 1846, between three or four years previous to the trial. There was great irregularity in the left side of the lower jaw of Dr. Parkman, which occasioned much trouble in filling. On this left side was the largest block. After being set, the Dr. complained that he had not room enough for his tongue, to obviate which, the witness ground off the lower jaw, which, from want of space, he was compelled to do on a very small wheel. The effect of this was to remove the pink color which was to represent gums and enamel. The shape left by the grinding was peculiar, because of its being ground on a small wheel. He was enabled, as he stated, to recognize the shape of the outline as being the same that he had labored on so long. On finding and comparing the model with the left lower block, the resemblance was very striking. The remains of the Marchioness of Salisbury were identified by the jaw-bone having gold appendages for artificial teeth. There is great danger that on such occasions public opinion, feeling, or passion, may warp the judgment, and sometimes even pervert the facts. The celebrated case of the body of Timothy Monroe being identified as that of William Morgan, the murdered freemason, in 1827, will present a case fully in point. The proof from the testimony of Mrs. Morgan, the family physician, and others, seemed to leave scarcely any doubt on the subject. The bald head, gray beard, much hair on the breast, long white hairs in the ears, mark of innoculation on the left arm, the teeth double all round, two of them extracted from the same side of the face, the dentist having the very teeth which fitted exactly, the marks of a surgical operation upon the large toe of the left foot, all seemed to be proof of a character that could leave little doubt remaining, notwithstanding the clothes found on the body were different from any Morgan had ever worn, and his pocket was found to be full of tracts published by the British Tract Society. The verdict was that *the body was that of William Morgan.* Soon afterwards, a Canadian advertisement for the body of Timothy Monroe caused the remains to be disinterred, when, on the holding of a second inquest, it was discovered that *the teeth were not* *double all round in front*, and that *five* had been extracted from this body, whereas Morgan had lost but *two*. The jury, fourteen days after the other inquest, found the body to be that of Timothy Monroe.

It is an important inquiry what proofs, in relation to identity, can be derived from the skeleton itself; and, in the first place, it is inquired whether any results as to the probable stature of the party can be arrived at from the examination of an extremity or a bone. M. Sue has attempted to answer this inquiry so far as concerns the extremities. He has embodied the results of his measurements in a table; but it appears, from subsequent examination, that these results are to be received with caution. It has been remarked that from the twentieth to the twenty-fifth year, the superior border of the symphysis pubis forms the centre of the body, and this continues through the more advanced ages, the only change taking place in old age being the curving of the spine. Previous to adult age, the centre of the body varies according to the age. *Guy*, 33.

The skeletons of the two sexes bear to each other a much greater resemblance prior to puberty than subsequently. The bones in the female are lighter, more cellular, and less marked either by asperities, or by being curved by muscular action, or by processes, than those of the male. The female skull is smaller, more oblong, and less depressed at the sides. The jaws and teeth are also smaller, and the chin less prominent. The sternum is shorter, and more convex; the ensiform cartilage thinner and later ossified; the ribs more delicate, and their cartilages longer; and the antero-posterior diameter longer than the lateral. *Guy*, 47–8.

The stature of the female is, on the average, considerably less than that of the male. The great relative differences between the two are to be found in the width of each at the hips and shoulders. In the former, the female skeleton exceeds the male; in the latter, it is just the reverse.

The most marked point of difference is to be found in the pelvis. The following are the principal points of difference:

1. In the male, there is a certain roughness, bulkiness and

weight; in the female, more lightness, smoothness and elegance.

2. In the male, the ilia are more erect; in the female more expanded.

3. In the male, the brim is more rounded, the longest diameter stretching from before backward; in the female, more oval, the long diameter lying between the sides.

4. In the male, the pelvis is deep; in the female, shallow.

5. In the male, the outlet is small; in the female, capacious.

6. In the male, the arch of the pubis is contracted; in the female, capacious, in order to make room for the ready passage of the head. 2 *Beck*, 24–5.

III. SURVIVORSHIP.

There are often important rights attached to survivorship. The descent of property is frequently made dependent upon it. A mother and her child both die during delivery. Which one survived the other? If the mother survived the child, then her heirs are entitled to her property. If the child the mother, then its heirs are entitled to it. The rights of the claimants all depend upon the simple fact of survivorship. In the absence of all direct proof, therefore, how is a question of this kind to be settled?

Our law has laid down no rules on the subject. The evidence, at best, can amount to probabilities, and these must be derived from the medical profession. These probabilities may arise in two classes of cases. The first of these relates *to the survivorship of mother and child, when both die during delivery.*

The presumption here is somewhat dependent on circumstances. There are several causes that go to favor the survivorship of the mother. The infant may die,

1. From a difficult or slow delivery:

2. From pressure on the umbilical cord:

3. From partial detachment of the placenta, giving rise to hæmorrhage:

4. From the parturitions being complicated with convulsions

5. From the infant being very large, or prematurely born.

There are, however, certain causes that may destroy the life of the mother first. Sudden accidents, such as drowning, a blow on the head, or violent hæmorrhage, may have this effect. The child may also survive if the death of the mother be owing to a severe acute disease. But if the mother die of a lingering wasting disease, the probabilities are in favor of her survivorship.

The second class of cases relates to the question of survivorship where *two or more are destroyed by a common accident, such, for instance, as a shipwreck.* Questions of this kind generally arise in those cases where father and son, or husband and wife perish by a common accident, and no direct proof can be obtained as to which of the two survived. The Roman law in such cases adjudged the survivorship to the husband; and in case of father and son, to the son, if he had arrived at his majority; and, in case of two individuals, the one not having arrived at the age of puberty, to the one who had passed that period.

The code Napoleon makes the following provisions:

"If several persons, naturally heirs of each other, perish by the same event, without the possibility of knowing which died first, the presumption as to survivorship shall be determined by the circumstances of the case, and in default thereof, by strength of age and sex:

If those who perished together, were under fifteen years, the oldest shall be presumed the survivor:

If they were all above sixty, the youngest shall be presumed the survivor:

If some were under fifteen, and others above sixty, the former shall be presumed the survivors:

If those who have perished together, had completed the age of fifteen, and were under sixty, the male shall be presumed the survivor, where ages are equal, or the difference does not exceed one year:

If they were of the same sex, that presumption shall be admitted which opens the succession in the order of nature, of course the younger shall be considered to have survived the elder." 1 *Beck*, 494.

These are cited as being generally founded on correct physiological principles, except that where those under fifteen are adjudged to survive those over sixty, there is thought to be an error; as that would embrace infants who would probably perish much sooner than those over sixty.

It may be stated, in general terms, that the body arrives at its maximum of strength and vigor at from twenty-five to thirty years of age, and continues in possession of that strength up to about fifty years. Before and after these periods the power of endurance will become very gradually less.

There have been but few decisions upon this point, too few to settle many principles in reference to it. In the case of *Satterthwaite vs. Powell*, 1 *Curtis' Eccl. Reports*, *Major Armett*, *his wife and four children*, all perished together by shipwreck. In this case the court decided that the parties must be presumed to have died at the same time, and the fact of the husband's survivorship not being affirmatively made out, administration must pass to the next of kin.

In the case of *General Stanwix*, who perished with his daughter, by shipwreck, the court could not come to any decision, but advised a compromise, to which the claimants agreed. *Guy*, 403; 1 *Beck*, 495, *&c.*

In the case of *Taylor* who, with his wife, perished by shipwreck, the court presumed the survivorship of the husband, and granted administration to his next of kin. 1 *Beck*, 496, *et seq.*

The same decision was made in the case of *Selwyn and his wife* in 1831.

In the case of *The King vs. Hay*, 1 *Blackstone's Reports*, 640, where a father and his only daughter perished at sea in the same vessel, the court did not decide the question of inheritance, but Lord Mansfield recommended a compromise, and said there was no legal principle on which he could decide it.

In *Wright vs. Sarmuda*, 2 *Phillmore*, 266, where the husband with his whole family perished together by shipwreck, the court held that they all died together and that none could transmit rights to others.

In *Taylor vs. Diplock*, 2 *Phillmore*, 261, the court held to the same doctrine as applicable to husband and wife under the same circumstances.

IV. LIFE ASSURANCE.

"Life assurance is a contract by which the underwriter, for a certain sum, proportioned to the age, health, profession, and other circumstances of that person whose life is the object of insurance, engages that the person shall not die within the time limited in the policy; or if he do, that he will pay a sum of money to him in whose favor the policy was granted." 2 *Park on Insurance*, 571. The period of time insured may be limited to a certain number of years, or it may be during the life of the individual.

The policy expresses the terms of the contract between the parties. It usually excepts the case of death by suicide or by the hands of justice. It may also be rendered void by any fraudulent concealment on the part of the assured.

The business of life assurance is now carried on very extensively, and the general mode of proceeding is so well understood as to require but slight notice. The offices generally have in their employ a physician, whose duty it is to examine and report upon the condition, and state of health of the applicant. They also generally present a list of questions which the medical attendant of the applicant is required to answer in writing. These relate principally to present and past states of health, hereditary predispositions, habits of life, and diseases with which he may have been attacked. The general object to be accomplished is to determine the degree of risk attending the proposed insurance.

The more precise and definite the questions proposed, and the more fully they are made to cover the whole ground of risk, the less occasion will be likely to arise for litigation. Still some questions submitted may be answered in perfect good faith, and yet give rise to disputes. Thus the applicant may be suffering from indigestion, or some trifling disorder which the physician says nothing about, as he does not look upon it as having a tendency to shorten life. All such, therefore, may become questions in courts of law, to be decided on medical testimony.

In the case of *Sir James Ross*, who was warranted in good health at the time of making the policy, it was decided that the omission to state the receipt of a wound, having no connexion with the fever of which he died, did not avoid the policy. That the only question was "whether he was in a reasonable good state of health, and such a life as ought to be insured on common terms."

In the case of *Breasted vs. The Farmers' Loan and Trust Company*, 4 *Hill*, 75, the question came up for decision whether an act of suicide can be perpetrated by an insane person. An action was brought on the policy. The plea interposed was that the policy excepted death by his own hand, and that the assured had committed suicide. Replication that when he committed it he was mentally deranged. Demurrer to the replication. The court sustained the demurrer; thus settling the principle, that the suicide excluded by the policy was such as could not be inflicted by an insane mind. This is in accordance with the principle laid down by Blackstone in 4 *Blackstone's Com.*, 184, that suicide involves the deliberate termination of one's existence, while in the possession and enjoyment of his mental faculties, and that self slaughter, by an insane man or a lunatic, is not an act of suicide within the meaning of the law.

In another case which occurred in England, the policy was contested on the ground that no mention was made of spasms and cramps from fits of the gout, but the court decided that a warranty can never mean that a man has not the seeds of a disorder, for we are all born with the seeds of mortality in us; and that a man subject to the gout, is alike capable of being insured, if he has no sickness at the time to make it an unequal contract.

In the case of *Swete vs. Fairlie*, 6 *Carrington & Payne*, 1, it was decided that a policy of insurance on the life of another person, who at the time of the insurance, is in a good state of health, is not vitiated by the non-communication by such person of the fact of his having, a few years before, been afflicted with a disorder tending to shorten life, if it appears that the disorder was of such a character as to prevent the party from being conscious of what had happened to him while suffering under it.

In the case of *Watson vs. Mainwaring and others*, 4 *Taunton*, 763, the recovery was resisted on the ground that he stated in his declaration that he labored under no disorder which tended to shorten life, whereas he had been afflicted with symptoms of *dyspepsy.* As it was proved to have been neither "organic nor excessive" the recovery was allowed.

In 1 *Carrington & Payne's Nisi Prius Reports*, 360, a recovery was successfully resisted, on the ground that the individual omitted to name his actual medical attendant, but named one who had formerly attended him, but had not for the three years next preceding the date of the application, and during which time he had labored under serious illness.

It was proved in a case tried at York, in 1835, that the individual labored under insanity at the time the policy was effected; but as all the medical witnesses, except one, testified that they did not think this disease had a tendency to shorten life, a verdict was given to the plaintiff.

If the applicant is addicted to habits of intemperance, that fact should not be concealed from the insurers. In two cases the actions were defeated upon the ground that the knowledge of such habits had been withheld, although the health of the individuals was at the time, apparently good. 6 *East's Rep.*, 188; 5 *Bingham*, 503.

In the case of the Earl of Mar, related by Professor Christison, the question arose whether the habit of taking opium to excess for many years was one tending to shorten life. The case was decided chiefly on a technical ground, and was finally compromised.

In the matter of life assurance there is much yet to be learned:

1. As to the effect of alcoholic liquors on the duration of human life:

2. As to the effect of certain habits of living, and of certain arts, trades, and professions on longevity: and,

3. What extent of influence certain diseases, such as inflammations, apoplexy, &c., have in shortening life, although the individual has apparently entirely recovered from their effects.

MEDICAL EVIDENCE.

The great object of the science of Medical Jurisprudence is to qualify medical men for testifying understandingly in courts of justice. The general rules bearing on this subject are essentially the same in whatever court the physician may be called upon to testify. The court in which he is the most frequently and constantly called upon is the coroner's. The great object here is to enquire into all cases of death attended by circumstances of an unusual or suspicious nature.

In this state, whenever a coroner receives notice that any person has been slain, or has suddenly died, or has been dangerously wounded, a jury must be summoned of not less than sixteen, nor more than twenty-three. The jury's first duty, after being sworn, is to view the body, without doing which the inquest is void. They next hear evidence as to the cause of death. The inquest is generally held in a public house nearest to the spot where the body was found. The coroner has the power of summoning witnesses and of compelling their attendance. The witnesses are sworn previously to being examined, their testimony is reduced to writing, and returned, together with the inquisition of the jury, to the next criminal court of record that shall be held in the county.

The necessity that is almost always found to exist of having the attendance of a medical witness has led, in many instances, to the selection of physicians to fill the office of the coroner. This, in the common run of cases, might save the necessity of the attendance of a medical witness. In England a provision has been made to remunerate the medical witness for his time and attendance upon this court, but hitherto none has been made in this state. He may be compelled to attend all criminal trials in the different courts of this state without any pecuniary compensation. This operates as a peculiar hardship, especially as he is often called upon to make post-mortem examinations with a view to ascertain the cause of death, and sometimes to analyze suspected fluids. His duties as a witness, however, do not require him to make this examination or to analyze those fluids. The law demands of him only what he actually knows, and cannot compel him to acquire additional knowledge. It is, therefore, at his own option whether he will make post-mortem examinations, or analyze suspected fluids.

The coroner's court is the only tribunal that can originate enquiries into the cause of death where no suspicion attaches to any party as guilty. Its finding is never final either as to the cause of death or the party that occasioned it. As the same matter is generally destined to undergo other and much more searching investigation in higher courts, it becomes very necessary that the medical witness should be extremely cautious in giving his testimony, because if he is not, he will be embarrassed in his second examination, as his previous deposition may be brought up and compared with what he is giving on the trial.

Witnesses in all courts are either *common* or *skilled.* The duty of the first is simply to state facts; that of the second, to state opinions. The medical witness may be required to do either, but when regarded purely as a medical witness, he is a skilled one, or as is more commonly termed, *an expert.*

The principle upon which the skilled witness gives his testimony is by no means confined to the medical witness. It embraces all matters of science, and all questions of skill and judg ment. In all such, men of knowledge and experience may be required to give their opinions. These opinions are presumed to be grounded upon such a knowledge of facts and principles as to entitle them to great weight and consideration. A medical witness need not even be acquainted with the case in relation to which his testimony is required. He may hear the evidence of others, and then be called upon to prove the general effect of the disease they describe, and its probable consequences in the particular case. So in regard to the effects of wounds, medical witnesses may be always required to show whether they were of such a character as to result in death.

The duties of a witness when called on to the stand, are to answer as clearly and intelligibly as possible, the questions asked him by counsel, court, or jury. If the precise answer will not elicit the whole truth, whatever is wanting to do that should be supplied. The witness, however, should understand that it is no part of his duty to volunteer statements not required of him, and not directly connected with the matter in controversy. Whenever he undertakes to do that, he is very likely to furnish points upon which he can be more or less embarrassed in his cross-examination. The language made use of should be plain, simple, and, if possible, devoid of all technical terms.

The first examination is made by the counsel calling him, which is termed his *direct examination.* The object of this is to elicit the opinion of the witness on the point in controversy. This opinion every medical man, every skilled witness, is entitled to give. The value of it will depend upon the knowledge on which it is based. It is, therefore, important that the opinion thus given should be thoroughly sifted, to get at the foundation on which it rests. This is usually done by the opposing counsel, in what is called his *cross-examination.* Here all the possible grounds may be examined, and all the knowledge in relation to the particular subject, together with the means and facilities of acquiring it, inquired into. This sometimes takes a great length of time, and is extremely tedious and embarrassing. The result of this cross-examination tends either to establish or weaken, and sometimes entirely invalidate, the opinion given.

It should be constantly borne in mind by the medical witness, that so far as he speaks in the character of an expert or skilled witness, he has nothing to do with collateral circumstances. This opinion should be based entirely upon the medical facts which are made to appear in the case, and the medical principles that are applicable to them. The intermingling of common with medical facts, and the statement of opinions founded on both, will effectually destroy all confidence in any opinions thus formed and declared.

A question has been raised whether a medical witness, while testifying on the stand, is at liberty to cite medical authorities, and to refer to and read them, for the purpose of fortifying his own opinion. This he is not in form permitted to do. He may refer to authorities, and state from recollection what they contain in reference to the point in controversy; but he is presumed to embody in his own opinion the views and ideas of the leading authorities of his profession.

Whenever a medical practitioner becomes acquainted with a case which he either knows, or has good reason to believe, will be made a matter of legal investigation, he should avail himself of the earliest opportunity to reduce his observations to writing, in which form they should be preserved. From notes, or written memoranda thus made at the time, or as soon after as is practicable, he will be permitted to refresh his memory, while testifying, and thus be enabled to be much more full, complete and satisfactory in his testimony than he could possibly be without their assistance.

Another thing of great importance for a medical witness to understand is how far the law will protect him in refusing to state confessions which the patient may have made to him in confidence. All facts communicated by a client to his legal adviser, which are essential or necessary to enable him to advise or act upon, in a matter of business, or which the client has good reason for believing to be thus essential or necessary, are within the rule of protection, and the counsel has no right to give them in evidence in a court of law. *Annesley* vs. *Lord Anglesia*, 17 *How. St. Tr.*, 1239 to 1244.

In relation to the clergy, a case is reported in 2 *City Hall Recorder*, 80, in which the point came up before the mayor, the late De Witt Clinton, whether confessions made to a Catholic priest, in accordance with the discipline of the church, could be given in evidence in a court of justice. The rule established in England was to compel the production in evidence of confessions made under such circumstances. In the case above referred to, it was held that the confessions were within the rule, and, therefore, could not be given in evidence. In regard to the clergy of other denominations, in which confession forms no part of church discipline, they are not within the rule of protection, and hence they may be compelled to disclose all confessions made, however secret or confidential they may have been.

In regard to physicians, in all the States of the Union except New-York and Missouri, the physician may be compelled to testify what his patient may have admitted to him, however secret or confidential may have been the communication. This was also the law in this state, until the Revised Statutes of 1830, see 2 *R. S.*, 406, § 73, enacted that "no person duly authorized to practice physic or surgery shall be allowed to disclose any information which he may have acquired in attending any patient in a professional character, and which information was necessary to enable him to prescribe for such patient as a physician, or to do any act for him as a surgeon." This affords complete protection so far as the communication made is of such a character as the act requires. Beyond that, the principle of protection does not extend. Within the principle of protection, the party may, if he choose, waive the privilege, in which case the facts may be disclosed.

The refusal of a witness to testify what may legally be required of him, will subject him to imprisonment for a contempt of court, until he is willing to comply with what the law demands.

It may become important to know what are the legal requisitions of a confession, or what qualities it must possess before it can be given in evidence: "A confession, in order to be admissible, must be free and voluntary; that is, it must not be extracted by any sort of threats or violence, nor obtained by any direct or implied promises, however slight, nor by the exertion of any improper influence." No confession made to a physician can be given in evidence, unless received with the qualifications above mentioned. The physician should also be enabled to testify as to the state of the mind of the party making the confession.

One other topic remains to be adverted to under this head, and that is the subject of *Dying Declarations.* These the physician will be the most likely to hear, and hence they become the most important for him to understand. In the admission of these declarations in evidence, the law, from the necessity of the case, is compelled to dispense with a test which it deems all-important in eliciting the truth, and that is, the cross-examination of the witness. It permits the dying man to speak without being subjected to this test. As an equivalent for this, no declarations of that kind can be admitted unless under very peculiar circumstances. The law requires two things to render them admissible. The one is, that the party making them shall be in a dying state at the time they are made; and the other is, that he shall himself be fully aware that he is in that state. It is necessary that he should be placed under the most solemn circumstances, as he is allowed to speak without the sanction of an oath. The physician will be expected to state what his real situation and condition were, and probably also what he thought his situation to be at the time he made the admission.

It is further necessary, to entitle them to admission, that the death of the deceased should be the subject of the charge, and the circumstances of the death, the subject of the dying declaration. "As the declarations of a dying man are admitted on a supposition that in his awful situation, on the confines of a future world, he had no motives to misrepresent, but on the contrary the strongest motives to speak without disguise and without malice, it necessarily follows, that the party against whom they are produced as evidence, may enter into the particulars of his state of mind, and of his behavior in his last moments; or may be allowed to show that the deceased was not of such a character as was likely to be impressed with a religious sense of his approaching dissolution."

INDEX

A.

ABBOT,
    case of, 548.
ABDOMINAL ENLARGEMENT,
    sign of pregnancy, 52.
    when commences, 52.
    when ceases, 52.
    when owing to other causes, 53.
ABDOMEN,
    wounds of the, 231.
ABORTION,
    statutes of New-York concerning, 126.
    by what means produced, 130.
    natural causes productive of, 130.
    practiced in the city of New-York, 138.
    principal points to be attended to in case of, 139.
ABSORPTION OF POISONS,
    facts going to show, 295.
ACCESS,
    legal presumption of, 80.
ACIDS, MINERAL,
    their properties, 330.
    the symptoms they produce, 330.
    treatment in case of poisoning with, 333.
    three principal acids, what, 333.
ACID, NITRIC OR SULPHURIC,
    evidence of administration of, 331.
    morbid appearances caused by, 332.
ACID, SULPHURIC,
    how distinguished from others, 333.
ACTS
    indicating volition after wounds, 260.
ACONITUM NAPELLUS,
    monkshood, 406.
ADAMS, PHINEAS,
    remarkable case of, 600.
ADIPOCERE,
    how appearing and from what formed, 424.

AGE,
  modifying character of wound, 270.
  a physical cause of impotence, 5.
  or period within which conception may occur, 70.
  considered as affecting the question of identity, 612.
  centre of the body, means of distinguishing, 612.
  times at which the first set of teeth appear, 612.
  times at which the dentes sapientiæ appear, 613.
  what effect it has upon the bony systems, 613.
AGGREGATION,
  state of, a modifying circumstance, 299.
AIR,
  an element essential to putrefaction, 422.
ALCOHOL,
  through what medium it acts, 409.
  effect of in small doses, 410.
  symptoms of poisoning by, 410.
  morbid appearances caused by, 410.
  treatment in case of poisoning by, 410.
ALDEN, LYDIA,
  case of, 274.
ALKALIES AND THEIR SALTS, 337.
  mode of action of, 337.
  symptoms of poisoning by, 337.
  post-mortem appearances caused by, 338.
AMMONIA,
  what, 339.
  symptoms of poisoning by, 339.
  morbid appearances caused by, 339.
  remedies in case of poisoning by, 340.
ANDROGYNÆ,
  what, 19.
ANDROGYNI,
  what, 18.
ANIMALS,
  experiments on, as evidence of poisoning, 314.
ANIMAL HEAT,
  extinction of as a cause of death, 419.
ANIMALCULÆ
  in semen, 30.
ANIMAL MATTER DECAYED,
  poisonous, 384.
ANNESLEY, RICHARD,
  case of, 245.
ANTIDOTES TO POISON,
  with what view given, 304.
ANTIMONY,
  salts of, 380.
APOPLEXY,
  what it arises from, 385.

APOPLEXY—*(Continued.)*
  how distinguished from narcotic poisoning, 386.
  of the congestive kind, 387.
  of the serous kind, 387.
  from extravasation, 387.
  how it occurs, 428.
  what to have reference to in cases of, 428.
  of the simple kind, 428.
  as a cause of death by hanging, 441.
APPEARANCES
  not always produced by contused wounds, 209.
  case of, 210.
  from post-mortem examination, proof of poisoning, 309.
AQUA TOFFANIA,
  account of, 289.
ARCUS SENILIS,
  what, and how a mark of age, 613.
AREOLA,
  what, 48.
  its dimensions and color, 48.
  its raised appearance, turgescence, and glandular follicles, 49.
  when it appears, 50.
ARISTOTLE'S
  theory of functions of the testicles, 8.
ARNOLD,
  case of, 533.
ARSENIC,
  a metallic compound, 340.
  its different preparations, 340.
  its properties, 341.
  its solubility, 341.
  its taste, 341.
  its chemical tests, 341.
  tests of in liquids containing organic matter, 344.
  its action on the living system, 345.
  quantity necessary to produce fatal effects, 345.
  time within which its effects begin to be developed, 345.
  course and character of symptoms, 346.
  medium through which it acts, 346.
  first variety of symptoms, 347.
  second variety of symptoms, 348.
  third variety of symptoms, 350.
  when introduced into the system through other channels than the stomach, 351.
  points to be observed in reference to symptoms, 352.
  treatment in case of poisoning by, 353.
  post-mortem appearances in case of death by, 353.
  force of evidence derived from post-mortem appearances, 356.
ASCITES,
  how distinguished from pregnancy, 53.

ASPHYXIA,
  what, and how produced, 429.
  symptoms of, 429.
  appearances in dead body indicative of, 430.
  cause of, 430.
  nervous or syncopal, 433.
  from cerebral congestion, 433.
ATROPA BELLADONNA,
  deadly nightshade, 405.
AUDLEY, LORD,
  case of, 501.
AUSCULTATION,
  for what purpose used, 60.
AVENZOAR,
  case of, 12.

B.

BAGSTER, MISS,
  case of, 559.
BAGSTER ET AL. VS. PORTSMOUTH,
  case of, 530.
BALLOTEMENT,
  what, and how done, 59.
BANBURY PEERAGE
  case, 5.
BELLINGHAM,
  case of, 536.
BELL, J.,
  case of, 281.
BIRDSELL,
  case of, 588.
BIRTH,
  premature, 83.
  how long did child survive, 171.
BLADDER,
  state of before and after birth, 171.
  wounds of the, 233.
BLAKE,
  experiments by as to poisons acting by absorption, 298.
BLINDNESS,
  how imitated, 601.
BLIGHT,
  case of, 256.
BLOOD,
  character of fœtal and adult, 141.
  difference between fœtal and adult, 142.
  its distribution in different organs of the body, 144.
  ecchymosis or extravasation, proof of life, 147.
  changes in, indicating pregnancy, 43.

spots of, how identified, 217.
why poisons are not detected in, 296.
fluid state of, in death from drowning, 436.
BLOODY URINE,
how feigned and detected, 597.
marks as signs of rape, 30.
marks, difference between and menstrual discharge, 30.
BOWLER, KING vs.,
case of, 539.
BORN ALIVE,
what constitutes, 112.
BOUGHTON, SIR THEODOSIUS,
case of, 308.
BRAIN,
fœtal, changes in, 108.
state of in death from drowning, 436.
BREASTED vs. FARMERS' LOAN & TRUST COMPANY,
case of, 622.
BREASTS,
enlargement of indicating pregnancy, 47.
what enlargement may proceed from, 47.
BRINVILLIER, DE MARCHIONESS,
account of, 290.
BROGDEN vs. BROWN,
case of. 579.
BROWN,
case of, 260.
BROWN, WILLIAM,
case of, 512.
BURKE & HARE,
how they accomplished death, 44.
BURNING,
whether it occurred before or after death, 450.
inflicted during life, what the appearances, 452,

CÆSARIAN OPERATION,
what, 118.
effect of, 119.
case of, 119.
CALDERHEAD, Mrs.,
case of, 239.
CAMPHOR,
symptoms of poisoning by, 409.
CAMPBELL, MARGERY,
case of, 449.
CANTHARIDES,
its symptoms, 383.

CANTHARIDES—(*Continued.*)
    post-mortem appearances caused by, 384.
    treatment in case of poisoning by, 384.
CARBONIC ACID GAS,
    whence derived, 403.
    its effects when respired, 403.
    post-mortem appearances caused by, 403.
    treatment in case of poisoning by, 403.
CARBURETTED HYDROGEN GAS, 404.
CARTWRIGHT vs. CARTWRIGHT,
    case of, 528.
CARUNCULÆ MYRTIFORMES,
    what, 27.
    appearance of, 28.
CASALI,
    case of, 614.
CASES
    illustrating law applicable to wounds, 272.
CASTLEHAVEN, LORD,
    case of, 24.
CASTELLI, (SOMNAMBULIST,)
    case of, 519.
CATALEPSY,
    how feigned, curious instance of, 59.
CATALEPTIC SOMNAMBULISM,
    what, 521.
CAUTIOUSNESS,
    derangement of, 504.
    direction of derangement, how governed, 504.
    remarkable cases of derangement of, 505.
CATHARTICS,
    as cause of abortion, 132.
CHASTITY,
    its effect on impotence, 11.
CHITTY'S TEST OF MENTAL ALIENATION, 539.
CHEMICAL COMBINATION,
    a modifying circumstance, 299.
CHEMICAL ANALYSIS,
    evidence from in proof of poisoning, 310.
CHILD,
    how long been dead, 177.
CHILDREN,
    possible number of at one birth, 101.
CHRISTISON,
    case of supposed poisoning related by, 313.
CHOLERA,
    simple, distinction between and irritant poisoning, 322.
    Asiatic or malignant, distinction between and irritant poisoning, 323.
CICATRIX,
    form of, 265.

CICATRIZATION,
  stage of, 264.
CIRCULATION,
  cessation of, sign of death, 418.
CIRCUMSTANCES PROCLAIMING MOTIVE OF INFLICTOR, 257.
CIRCUMSTANTIAL EVIDENCE, 255.
CLASSIFICATION OF POISONS, 320.
CLEAVELAND, NORMAN,
  case of, 137.
CIVIL AND CRIMINAL RESPONSIBILITY,
  difference between, 530.
  difference in evidence of each, 531.
CLARK vs. FISHER,
  case of, 563.
CLEPTOMANIA, 502.
COLD,
  a means of destroying life of new born child, 181.
  effects of on system and surface, 450.
  by what means these effects have varied, 451.
  morbid appearances caused by, 451.
COLCHICUM, 406.
COLICA PICTONUM,
  lead colic, 376.
COMPOUND POISONING,
  what, 411.
  with arsenic and alcohol, 411.
CONDE, PRINCE DE,
  case of, 431.
COMPRESSION,
  how arising, 224.
  symptoms of, 224.
CONCEPTION,
  first change which follows, 40.
  subsequent changes following, 41.
  constitution changes, 41.
  change in features, 42.
  change in appetites, 42.
  while in a state of unconsciousness, 73.
  means of ascertaining, 81.
CONIUM MACULATUM,
  hemlock, 406.
CONSTITUTIONAL PECULIARITIES
  modifying wounds 270.
CONSTITUTIONAL DISEASE AND DEBILITY,
  cause of impotence, 10.
CONSTITUTIONAL PECULIARITIES WHICH INDICATE SEX, 20.
COMBUSTION, SPONTANEOUS HUMAN,
  its possibility, 452.
  phenomena attending it, 453.
  case of, 454.

COMMISSIONS IN CASE OF ALLEGED LUNACY,
  and law in relation to, 468.
  proceedings had under same, 469.
  legal questions arising under same, 470.
CONDITIONS OF DERANGED MIND
  leading to irresponsible acts, 553.
CONCUSSION OR COMMOTION,
  what, 213.
  how arising, 222.
  cases of, 223.
  symptoms of, 224.
CONSIDERATION,
  inadequacy of, as evidence of mental weakness, 558.
CONSUMPTION,
  how feigned, 594.
CONTRACTIONS AND DEFORMITY,
  how feigned and detected, 603.
CONTUSION,
  what, 200.
CONVULSIONS,
  how imitated, 599.
CONTUSED WOUNDS,
  how inflicted, 237.
COOPER, SIR ASTLEY,
  case by, loss of testicle, 8.
COPPER, SALTS OF,
  for what purpose used, 369.
  its different compounds, 370.
  its tests, 370.
  its symptoms, 371.
  the post-mortem appearances it causes, 372.
  treatment in case of poisoning by, 372.
  its use for culinary and domestic purposes, 373.
CORD,
  mark of in case of death from hanging, 443.
  depends probably on the manner of death, 444.
CORONER,
  his duties, &c., 624.
  court, and duties, 624.
CORNIER, HENRIETTA,
  case of, 512.
COREY,
  case of, 547.
CORPUS LUTEUM,
  what, 66.
  how distinguishable, 67.
  when it changes and disappears, 68.
  points of difference between true and false, 69.
CORPORA LUTEA,
  false, how formed, 69.

CORROSION,
what, 293.
COUNTENANCE,
evidence from, in case of death by hanging, 442.
COURVOISIER,
case of, 256.
CRANIUM,
preternatural thinness of, 271.
CRETINISM, 474.
CRIMINAL ACTS,
how distinguished from insane, 578.
CRICHTON, DR.,
extraordinary case related by, 417.
CROIX, SAINTE.
account of, 291.
CROWN PRINCE OF SWEDEN,
case of, 308.
CURTESY,
tenant by, 112.

DATURA STRAMONIUM,
thorn-apple, 406.
DAUTUN,
remarkable case of, 250.
DAVIES, EDWARD,
case of, 555.
DEAFNESS,
how feigned, 601.
DEATH,
natural or accidental, mode of in child, 190.
whether occasioned by injury or previous disease, 274.
sudden, what it arises from, 426.
by drowning, at what period it takes place, 437.
what it is, 413.
whether real or apparent, 415.
signs of, what they are, 418.
DELIRIUM,
what, 516.
singular case of, 517.
difference between and mania, 518.
legal consequences of, 579.
DELIRIUM TREMENS, 523.
its characteristics, 524.
legal consequences of, 587.
DELIVERY, 92.
when concealed, to what points to refer, 92.
deceptive, how detected, 93.
can a woman be delivered, and remain unconscious, 94.

DELIVERY—*(Continued.)*
    signs and indications of recent, 96.
    within what time examination should be made, 98.
    what diseases may produce effects that may be mistaken for, 99.
    does not always follow pregnancy, 100.
    permanent indications of, 101.
    signs of life or death of child before or during, 116.
    signs of death during, 118.
    signs of life during, 117.
    signs of in case of death of mother, 120.
    summary of things connected with, 121.
DELUSION AS A TEST OF INSANITY, 583.
DEMENTIA,
    what, and how distinguished from idiocy and imbecility, 481.
    how distinguished from mania, 482.
    when arising from sudden shock, 482.
    incoherence, feature of, what, 483.
    senile; what, and how characterized, 484.
    second degree of, 485.
    third and fourth degrees of, 485.
DESHA,
    case of, 423.
DESIGN OR CONTRIVANCE,
    as a test of insanity, 541.
    analysis of, 542.
DESPAIR,
    remarkable case of, 505.
DESTRUCTIVE PROPENSITY,
    two forms of derangement of, 506.
    two subdivisions of, 508.
DEVANBAGH vs. DEVANBAGH,
    case of, 4.
DEW vs. CLARK,
    case of, 570.
DIAPHRAGM,
    indications of life from, 170.
    wounds of the, 230.
DIATHESIS,
    preternaturally hæmorrhagic, 271.
DIARRHŒA,
    how produced, 597.
DIFFERENCE OF TISSUE AND ORGAN,
    modifying circumstance in case of poisoning, 300.
DIGITALIS,
    fox-glove, 407.
DISEASE, PREVIOUS,
    did it preëxist, or was it a consequence of injury, 274.
    or injury subbsequent, as a modifying circumstance, 276.
    how modifying, 303.
    of heart, how feigned, 595.

DISCHARGES FROM VAGINA,
not gonorrhœal, 32.
DISLOCATION,
what, 214.
DIURETICS;
as abortives, 133.
DROWNING,
means of destroying life of new born child by, 180.
causes of death by, 432.
appearances presented in case of death by, 433.
signs and indications of death by, 434.
whether result of accident, suicide, or homicide, 439.
DREW,
case of, 587.
DRUNKENNESS, 521.
progress of, 522.
effects of on brain, 522.
periodical, 523.
legal consequences of, 585.
laws of different countries in relation to, 586.
common law of England in relation to, 586.
effects of on civil contracts, 587.
effect of on criminal acts, 587.
acts committed in, after injuries of the head, &c.. 589.
DRUNKARD, HABITUAL,
provided for by laws of New-York, 590.
DUCTUS ARTERIOSUS,
what, 143.
changes in after birth, 172.
DUCTUS VENOSUS,
what, 143.
changes in after birth, 172.
DUNCANS,
case of, 258.
DYING DECLARATIONS,
under what limitation received in evidence, 628.
DYSMENORRHŒA,
membranes expelled in, 65.

E.

EARL OF ESSEX,
case of, 256.
EARLY OVUM,
when expelled, how examined and identified 63.
ECCHYMOSIS,
what, 200.
its cause, 200.
its seat, 201.
its form, 202.

ECCHYMOSIS—*(Continued.)*
    its history, 202.
    its diagnosis, 204.
    before and after death. 207.
ECSTASIS,
    definition of, 521.
EDMONDS', JUDGE,
    charge in the case of Kleim, 549.
ELLENBOROUGH ACT,
    what, 125.
EMETICS,
    as cause of abortion, 132.
EMMENAGOGUES,
    as abortive agents, 133.
EPILEPSY,
    liable to be confounded with narcotic poisoning, 388.
    means of distinguishing between, 388.
    how feigned and detected, 598.
    distinctions between real and pretended, 598.
ERETHYSM,
    mercurial, symptoms of, 363.
    whether intermittent or not, 364.
ERGOT,
    as an abortive agent, 134.
EROTIC MANIA, 500.
ERSKINE'S
    grounds in the case of Hadfield, 535.
EVANS' POTHIER ON OBLIGATIONS,
    principles laid down in, 571.
EVANS vs. KNIGHT & MOORE,
    case of, 581.
EVIDENCE,
    general sources of in reference to poisoning, 305.
    from post-mortem examination, 309.
    from chemical analysis, 310.
EXCORIATION OF FINGERS,
    as proof of death by drowning, 436.
EYE,
    state of, as a sign of death, 419.

F.

FACE,
    wounds of the, 227.
FEMALE,
    violated without her knowledge, 35.
FEVER,
    how feigned, 594.
FEIGNED DISEASES, 591.
    effect on, of standing armies, 591.

- FEIGNED DISEASES—*(Continued.)*
  - rules laid down by Zacchias for detecting, 592.
  - not all diseases feigned with equal ease, 593.
- FISH vs. PALMER,
  - case of, 112.
- FISH,
  - some kinds of, poisonous, 384.
  - treatment in case of poisoning by, 384.
- FŒTAL MOVEMENTS,
  - in utero, how excited, 56.
  - two species of, 56.
- FŒTAL LIFE,
  - progress of, 104.
- FŒTAL STATE,
  - changes in and signs of maturity and immaturity, 104.
- FŒTAL CIRCULATION,
  - peculiarities of, 143.
- FŒTUS,
  - weight and length of, 109.
  - maturity of how characterised 111.
  - immaturity of how characterised, 111.
- FOY, VICTOR,
  - case of, 601.
- FORAMEN OVALE,
  - what, 143.
  - changes in after birth, 173.
- FRACTURE,
  - what, 213.
- FRANC MARIA,
  - case of, 507.
- FRANCIS, DR.,
  - case mentioned by, 116.
- FREEMAN,
  - case of, 548, 550.
  - report of trial of, 550.
- FROTH,
  - in larynx, &c., in death from drowning, 434.
  - in mouth and nostrils, evidence of death from drowning, 437.

G

- GANGRENE
  - stage, 266.
- GANGRENE AND LIVIDITY, 327.
- GARDNER PEERAGE CASE, 87.
  - questious involved in, 88.
- GASES,
  - certain of them irritant poisons, 385.
- GERAN, COUNTESS DE SAINT,
  - case of, 94.

GENITALS,
  wounds of the, 234.
GESTATION,
  period of, variable in animals, 82.
  protracted, 84.
  protracted, reasons against, 84.
  reasons answered, 85.
  protracted, authorities for, 86.
  protracted, laws favoring, 86.
  protracted, cases of, 86.
GODFREY, SIR EDMUNDBURY,
  case of, 447.
GUNSHOT WOUNDS,
  consideration of, 240.
  before or after death, 240.
  near or from distance, 241.
GRAAFIAN VESICLE,
  how surrounded and formed, 66.
GRAHAM'S LECTURE,
  extract from, 501.
GREENACRE,
  case of, 217.
GREENWOOD,
  case of, 569.

H.

HÆMOPTYSIS,
  how feigned and detected, 597.
HABIT,
  a modifying circumstance in cases of poisoning, 301.
HADFIELD,
  case of, 534.
HANGING,
  several signs and indications of death by, 443.
  whether it occurred during life or after death, 443.
  whether, accidental, suicidal, or homicidal, 445.
  cause of death from, 440.
  signs and indications of death by, 442.
HALE, LORD,
  law applicable to insanity, 532.
HEADACHE,
  indicating pregnancy, 43.
HEAD,
  wounds of the, 221.
HEART,
  injuries of the, 229.
HERNIA,
  how imitated, 602.

HERMAPHRODITISM,
    what, 17.
HERMAPHRODITES,
    classification of, 18.
HILAIRE, M. GEOFFRY ST.,
    work on hermaphroditism, 20.
HIPPOCRATICA FACIES,
    as a sign of death, 418.
HOAG OR PARKER,
    case of, 614.
HODGSON,
    case of, 317.
HOFFBAUER'S PRINCIPLE OF CRIMINAL RESPONSIBILITY, 573.
HOMICIDAL MANIA, 510.
    its discovery, 511.
    two forms of it, 511.
    cause of, 511.
    various causes of, 512.
    cases of, 515.
    general deductions from, 516.
HOPE,
    derangement of, 506.
HUME BARON'S,
    statement of test of insanity, 539.
HUNTER,
    case of impregnation related by, 8.
HYDROCEPHALUS,
    how imitated, 602.
HYDROCYANIC ACID, OR PRUSSIC ACID, 396.
    under what form found, 396.
    its tests, 397.
    its power as a poison, 397.
    on what it acts, 398.
    what dose required, 398.
    what time it begins, 398.
    how quickly it operates, 398.
    its symptoms, 400.
    how soon it proves fatal, 401.
    post mortem appearances caused by, 401.
    treatment in case of poisoning by, 402.
HYDROSTATIC TEST,
    on what principle dependent, 154.
    what when applied to the lungs, 154.
    objections to, 155.
    body lighter by putrefactive process, 155.
    answer to objection of putrefactive process, 156.
    float from artificial inflation, 158.
    answer to objection of floating from artificial inflation, 159.
    float from emphysematous condition, 161.
    answer to that objection, 162.

HYDROSTATIC TEST—*(Continued.)*
  other objections, 162.
  another class of objections, 164.
  value of test, 167,
  how application made of it, 168.
HYMEN,
  what, 26.
HYPOSPADIA,
  what, 7.

I.

IDENTITY,
  one instance in which it alone is tried, 613.
  the various marks and indications proving, 614.
  proofs of derivable from the skeleton itself, 617.
  difference between skeletons of male and female, 617.
IDIOCY,
  definition of, 473.
  how distinguished, 473.
  varieties of, 474.
  where most frequently found, 474.
  when feigned, recourse had to past history, 610.
IDIOSYNCRASY,
  a modifying circumstance in case of poisoning, 202.
IDIOT,
  how legally defined, 466.
IMBECILITY,
  how defined, 475.
  how distinguished from idiocy, 475.
  susceptible of some education, 475.
  systematised by Hoffbauer, 476.
  different degrees of, 477.
  as affecting the moral nature, 478.
  instance of moral, 480.
IMMERSION,
  effects of, on dead body, 439.
IMPOTENCE AND STERILITY. 2.
IMPOTENCE,
  what, 2.
  when questions of, arise, 3.
  kinds of, 4.
  physical causes of, 5.
  caused by what injuries and diseases, 11.
  constitutional indications of, 12.
  moral causes of, 12.
  curable causes of, 14.
  causes of, in female, 14.
IMPOTENCE AND STERILITY,
  arrangement of causes of, 15.

INCUBATION OF MANIA,
  what, 486.
INCISED WOUNDS INFLICTED DURING LIFE,
  characteristics of, 215.
  on dead body, 215.
INCISED WOUNDS AND PUNCTURED, 238.
INDULGENCE,
  its effect on impotence 11.
INFANTICIDE,
  questions discussed in, 123.
  legal provisions bearing on, 124.
  laws of different states concerning, 127.
  points to which attention should be directed, 194.
INFLAMMATION,
  how arising, 225.
  proceeding from irritation, 293.
INFLAMMATORY STAGE,
  what, 264.
INGRAM vs. WYATT,
  case of, 561.
INJURY,
  sufficiency of to cause mischief in healthy person, 273.
INQUEST,
  object of, where held, 425.
INQUISITION OF CORONER'S JURY,
  what, 425.
INSANITY,
  most frequently feigned, 605.
  popular impression as to what it consists in, 605.
  difficult of imitation, 606.
  have reference to motive, 606.
  feigned cases over act, 606.
  observe the moral displays, 607.
  really insane disregard the decencies and proprieties of life, 608.
  sleeplessness accompanies real insanity, 608.
  morbid irritability characterizes the really insane, 609.
INTELLECTUAL MANIA,
  how characterized, 492.
  how described, 492.
INTENT TO INJURE, ELEMENTS OF, 554.
INTESTINES,
  wounds of the, 232.
  inflammation of; distinction between and irritant poisoning, 323.
IRRESISTIBILITY
  absolves from accountability, 575.
  why it so absolves, 576.
  how this test applied in practice, 576.
IRRITANT CLASS OF POISONS,
  what included under, 320.
  what substances it embraces, 320.

IRRITANT CLASS OF POISONS—*(Continued.)*
- what symptoms it develops, 321.
- orders divisible into, 330.

IRRITANTS,
- morbid appearances caused by, 325.
- vegetable, 381.
- vegetable, what they are, 381.
- where poisonous property resides, 381.
- symptoms developed by, 381.
- morbid appearances caused by, 382.
- treatment in case of poisoning by, 382.

IRRITANTS, ANIMAL, 383.

IRRITATION,
- what, 293.

J.

J. K.,
- case of instance of moral mania, 499.

JACKSON vs. KING,
- case of, 556.

JARDINE, REV. FERGUS,
- case of, 82.

JOHNSON vs. MOORE'S HEIRS,
- case of, 570.

JURY, CORONER'S,
- their duties, 425, 624.

K.

KENNOWAY, DAVID,
- case of, 275.

KERR, J.,
- case of, 225.

KIDNEYS,
- wounds of the, 233.

KLEIM,
- case of, 549.

L.

LABOR,
- when it may be prematurely induced, 101.

LACERATED WOUNDS,
- what, 220.

LANARGAN,
- case of, 317.

LA VIGOREAUX AND LA VOISON,
- account of, 291.

LAW,
    applicable to wounds, 272.
    cases illustrating its application, 272.
    On what occasion interferes, in cases of non compos mentis, 467
    presumption of, 525.
LAWRENCE,
    case of, for shooting at President Jackson, 547.
LEGAL APPLICATIONS, 524.
LECAL CONSEQUENCES,
    of mental deficiency, 554.
    of mania, 568.
    of intellectual mania, 568.
    of moral mania, 574.
    of delirium, 579.
    of suicide, 582.
    of somnambulism, 585.
    of drunkenness, 585.
LEAD,
    why interesting, 373.
    its compounds, 374.
    its tests, 374.
    the symptoms it developes, 376.
    effects of constant use of, 378.
    post mortem appearances caused by, 378.
    treatment in case of poisoning by, 379.
    its use for culinary and domestic purposes, 379.
LEGITIMACY,
    consequences of illegitimacy, 79.
    who are legitimate, 80.
    legal rule relative to, 80.
    questions in, when and how arising, 80.
    what questions involved in, 81.
    legal rule governing, 81.
LEMON JUICE,
    spots of, mistaken for blood, 218.
LIFE,
    the orders of functions necessary to, 413.
    at what period of gestation fœtus endowed with, 129.
    of child, by what modes destroyed, 179.
LIFE ASSURANCE,
    how defined, 621.
    void from neglect to state name of actual medical attendant, 623.
    void from neglect to state intemperate habits of assured, 623.
LIGHTNING,
    persons found dead by, 454.
    how it operates, 451.
    post-mortem appearances caused by, 455.
LIQUID TESTS OF ARSENIC, 343.
LIVE BIRTH,
    meaning of term, 140.

LIVE BIRTH—*(Continued.)*
  proofs of from circulating system, 141.
LIVER,
  wounds of the, 233.
LOBELIA,
  cases of poisoning by, 382.
LOCHIA,
  what and how known, 98.
LOCUSTA,
  account of, 289.
LUCID INTERVALS,
  what, 526.
  D'Aguesceau's statement of, 526.
  their continuance, 527.
  evidence in support of, 528.
LUNACY,
  how derived, and what signifies, 466.
LUNGS,
  how prior and subsequent to birth, 145.
  what changes in their volume by respiration, 150.
  what changes in their situation by respiration, 151.
  what changes in their shape by respiration, 151.
  what changes in their color by respiration, 151.
  what changes in their consistence and density by respiration, 152.
  what changes in their specific gravity by respiration, 154
  injuries of the, 229.
LYING,
  species of insane manifestation, 504.
LYNDHURST, LORD,
  charge in case of King *vs.* Orford, 540.

M.

MACKENZIE,
  case of, 278.
MALFORMATION OR TRANSFORMATION OF PARTS, 270.
MALUM-REGIMEN,
  a modifying circumstance, 279.
MANIA,
  active forms of, 486.
  its incubation, what, 486.
  its physical indications, 487.
  its divisions, 488.
  general intellectual, what it consists in, 489.
    " " how characterized, 492.
  legal consequences of, 568.
  intellectual, legal consequences of, 568.
  moral, legal consequences of, 574.
MAR, EARL,
  case of, 623.

MARRIAGE,
effect of partial intellectual mania on contract of, 572.
MARSELIS vs. THALHIMER,
case of, 114.
MARSH'S HYDROGEN TEST FOR ARSENIC, 343.
MARTIN, JONATHAN,
case of, 507.
MATURITY,
has child arrived at, 140.
evidence of, 140.
MAYHEM,
questions arising in, 283.
statute law concerning, 283.
McDONOUGH,
case of, 589.
McNAUGHTON,
case of, 545.
McLAREN, JANET,
case of, 277.
MECHANICAL MEANS OF PROCURING ABORTION, 135.
MECONIUM,
what, 171.
MEDICAL EVIDENCE, 624.
MEDICAL JURISPRUDENCE,
deffinition of, 1.
classification of subjects in, 1.
MEDICO-LEGAL EXAMINATION OF WOUNDS,
how made, 284.
MEMBRANES RUPTURED BY INSTRUMENTS, 136.
MENINGITIS,
what, 389.
liable to be confounded with narcotic poisoning, 389.
MENSES,
what, 44.
suppressed during pregnancy, 45.
MENTAL ALIENATION,
subjects discussed under, 457.
its definition, 457.
its seat, 459.
its history, 460.
its causes, 461.
organic or physical causes of, 462.
moral causes of, 463.
principle on which legal exemption proceeds, 465.
forms of recognized by law, and division, 466.
classification of subjects embraced in, 472.
MERCURY,
general consideration of, 357.
its preparations, 357.
its tests, 357.

MERCURY—*(Continued.)*
- the symptoms it develops, 359.
- the three varieties of symptoms of poisoning by, 360.
- difference between symptoms of poisoning with arsenic and mercury, 360.
- second variety of poisoning with, 361.
- third variety of poisoning with, 362.
- symptoms characterizing mercurial erethysm, 363.
- secondary effects of, 365.
- inertness of, in metallic state, 366.
- strength of evidence resulting from symptoms, 367.
- post-mortem appearances caused by, 367.
- treatment in case of poisoning by, 369.

MILK IN THE BREASTS,
- a sign of pregnancy, 51.

MISCARRIAGE,
- exciting or immediate causes of, 131.

MIXTURE,
- a modifying circumstance in case of poisoning, 300.

MOIR, CAPT.,
- case of, 278.

MOISTURE,
- essential to putrefaction, 422.

MOLES,
- what, 63.
- when proof of pregnancy, 64.

MONROE, TIMOTHY,
- case of, 616.

MONSTERS,
- what the law regards such, 20.

MORAL CIRCUMSTANCES,
- as evidence of poisoning, 315.

MORAL MANIA, 495.
- how defined, 496.
- its division, 496.
- general, in what it consists, 496.
- change in the moral powers, 497.
- most observable in conduct, 498.

MORGAGNI,
- interesting case of poisoning, related by, 317.

MURDOCK, MISS SOPHIA,
- case of, 74.

MUSCULAR FUNCTION,
- necessary to life, 413.

MUSCULAR IRRITABILITY,
- extinction of, a sign of death, 419.

MUTILATIONS,
- singular instances of, 604.

N.

NAPOLEON,
    his order to stop suicidal mania, 510.
NARCOTIC CLASS OF POISONS,
    what included under, 320.
NARCOTIC POISONS,
    on what act, 385.
    usual symptoms of, 385.
    morbid appearances caused by, 385.
    chemical analysis of little use, 390.
NARCOTIC GASES,
    what, 402.
NARCOTICO-ACRID POISONS, 404
    whence derived, and how act, 404.
NARCOTICO ACRIDS,
    the symptoms caused by them, 405.
    post-mortem appearances caused by, 405.
    Orfila's division of them, 405.
NARCOTICO IRRITANTS OR ACRIDS,
    what included under, 320.
NAUSEA AND VOMITING,
    a sign of pregnancy, 46.
NEGRETTI,
    somnambulist, case of, 519.
NERVES OF NECK,
    compression of, a cause of death by hanging, 441.
NERVOUS FUNCTION,
    necessary to life, 413.
NERVOUS IMPRESSIONS, 294.
NICOTIANA TOBACCUM
    tobacco, 406.
NORKOTT,
    case of, 257.
NUX VOMICA,
    how exhibited, 408.
    its symptoms, what it acts on, 408.
    morbid appearances caused by, 409.
    treatment in case of poisoning by, 409.

O.

OPIUM,
    head of narcotic class of poisons, 390.
    where obtained, and its preparations, 390.
    chemical tests unable to discover, 391.
    how detected, 391.
    how it acts, 391.
    how it affects animals, 392.

OPIUM—(*Continued.*)
  how it affects man, 392.
  how soon it begins to operate, 393.
  symptoms of poisoning by, 394.
  quantity required for fatal dose, 394.
  morbid appearances caused by, 394.
  treatment in case of poisoning by, 395.
OPTHALMIA,
  how imitated, 600.
ORFORD, KING vs.,
  case of, 540.
ORGANS,
  malformations of so as to cause death at birth, 192.
  diseases of same, 193.
ORGANS, GENITAL,
  state of indicating death from hanging, 445.
OS AND CERVIX UTERI,
  state of in virgin, 56.
  changes in consequent on conception, 57.
    " from what other causes, 57.
    " proofs of progress from, 57.
OXALIC ACID, 334.
  how it acts, 335.
  symptoms of poisoning by, 335.
  post-mortem appearances caused by, 336.
  treatment in case of poisoning by, 337.
OXFORD, KING vs.,
  case of, 544.

P.

PAIN,
  under what forms feigned, 595.
  means of detecting when feigned, 596.
PALLOR OF FACE,
  sign of death by drowning, 434.
PARALYSIS,
  how feigned and detected, 597.
PARTIAL INTELLECTUAL MANIA,
  its peculiarities, 493.
  delusive ideas entertained in, 494.
PARTIAL MORAL MANIA,
  what it consists in, 500.
PARTIES,
  strength and situation of, in case of rape, 33.
PENIS,
  malformation or defect of, 6.
PEOPLE vs. HULSE,
  reference to, 24.

PERINEUM,
    laceration of in delivery, 98.
PERFORATION, 328.
    from corrosives, 328.
    from ulceration, 328.
    from softening during life or after death, 328.
PERSONS FOUND DEAD,
    questions arising in, 412.
PLACE WHERE BODY IS FOUND, 431.
PLOTT, Dr.,
    case of suspension mentioned by, 440.
PLOUQUET'S TEST,
    what, 146.
    objections to, 146.
POINTS
    to be attended to in case of suspected poisoning, 318.
POISON,
    mode of administration in experiments on animals, 314.
POISONING,
    as a means of destroying life of new born child, 189.
    art of secret, 289.
    history of art of secret poisoning, 289.
POISONS,
    questions discussed in, 286.
    definition of, 287.
    the law applicable to, 287.
    statute of New-York applicable to, 288.
    how introduced into the system, 292.
    their mode of action, 293.
    how conveyed from one organ to another, 294.
    circumstances which modify action of, 299.
    their arrangement and classification, 320
POLLOCK, Mrs.,
    case of, 239.
PORTSMOUTH, vs. PORTSMOUTH,
    case of, 558.
POSITION,
    in which body is found, to be noted, 431.
POST-MORTEM APPEARANCES,
    produced by mercury, 367.
    produced by copper, 372.
POWER OF DISCRIMINATING RIGHT FROM WRONG,
    a test of insanity, 537.
    analysis of, 537.
PREGNANCY,
    occasions for investigating, 37.
    may be feigned, 39.
    may be concealed, 40.
    sources of signs, and indications of, 40.
    spurious, when and how occurring, 71.

PREGNANCY—*(Continued.)*
  when complicated with disease, 72.
  ignorance up to time of delivery, 74.
  signs of death during, 117.
PREMATURE BIRTH, 83.
PRESSURE,
  its effect on artificial inflation, 159.
PRESUMPTION OF ACCESS,
  and that husband is father, 80.
PREVIOUS INJURY OR DISEASE,
  modifying medico-legal character of wounds, 271.
PTYALISM MERCURIAL,
  duration of, 364.
PULSATION OF FŒTAL HEART,
  its characters, 61.
PULSE,
  changes in, indicative of pregnancy, 44.
PUNCTURED WOUNDS,
  what, 220.
PURULENT STAGE,
  what and when, 264.
PUTREFACTION,
  as a sign of death, 421.
  how distinguished from gangrene, 421.
  several circumstances that modify it, 423.
PUTREFACTIVE PROCESS,
  objections to hydrostatic test, 156.
PYROMANIA,
  incendiarism, 506.
  cases of, 507.

Q.

QUALITIES TRANSMISSIBLE, 90.
QUANTITY ADMINISTERED,
  a modifying circumstance, 299.
QUEEN vs. RUMBALL,
  case of, 583.
QUEEN vs. GATHERCOLE,
  case of, 583.
QUESTIONS AND ANSWERS OF THE FIFTEEN JUDGES,
  in regard to law governing insanity, 545.
QUICKENING,
  what, 128.
  why important, 54.
  definition of, 54.
  what may be mistaken for, 55.
  time of, 55.

R.

RABELLO,
    case of, 514.
RAPE,
    what, 22.
    laws relating to, 22.
    laws of New-York relating to, 23.
    upon whom may be committed, 25.
    what to be made out on indictment of, 25.
    points to which attention should be directed, 25.
    may be followed by pregnancy, 35.
    summation of points to which to direct attention, 36.
RAYNOR,
    case of, 264.
RECTOR, HENRY,
    case of, 236.
REDLION vs. WOOLVERTON,
    case of, 89.
REDNESS OF STOMACH AND INTESTINES,
    pseudo-morbid, described, 326.
REINSCH'S TEST OF ARSENIC, 343.
RELATIONS OF BODY
    with surrounding objects, 431.
REMOTE ACTION OF POISONS,
    what, 294.
REPERCUSSION,
    what, and how done, 59.
RESEMBLANCE TO PARENT,
    as proof of paternity, 90.
RESPIRATION,
    prior to birth, 162.
    while in womb, 163.
    a voluntary act, 414.
    connecting link between sensorial, nervous and muscular functions, 415.
    cessation of as a sign of death, 418.
RESPIRATORY SYSTEM,
    proving life or death at birth, 149.
RESPONSIBILITY,
    difference between civil and criminal, 530.
REX vs. PHILIPS,
    case of, 128.
REX vs. HAINES,
    case of, 245.
RIDDER, JANE,
    case of, 520.
RIGIDITY OF MUSCLES,
    a sign of death, 420.

RODMAN, Dr.,
remarkable case mentioned by, 116.
ROGERS,
case of, 547.
ROSS, SIR JAMES,
case of, 621.
RUST,
spots of mistaken for blood, 218.

S

SALIVATION,
mercurial, in what manner it proves fatal, 365.
SAUNDERS,
case of, 288.
SAVINE,
as an abortive agent, 133.
SATTERTHAITE vs. POWELL,
case of, 620.
SCROFULA,
how imitated, 600.
SENSATIONS,
in case of death from hanging, 442.
SECRET POISONING,
art of, 289
SENSORIAL FUNCTION,
necessary to life, 414.
SEMEN,
how distinguishable, 30.
SEMINAL SPOTS,
how appearing and distinguishable, 31.
SENILE DEMENTIA,
when feigned, what proceeds from, 611.
SEPARATION
of the umbilical cord, 175.
SEX,
questions arising out of relations of, 2.
SEXUAL ORGANS,
blending or mingling of, 19.
SHAPE OF LUNGS
affected by respiration, 150.
SHOT,
distance between, indicates distance fired from, 245.
SYPHILIS,
as proof of rape, 31.
SIMPLE CHOLERA,
distinction between and irritant poisoning, 322.
SITUATION OF LUNGS,
affected by respiration, 150.

SKIN,
    state of as a sign of death, 419.
    changes in, after birth, 176.
SKELETON, FŒTAL,
    progress of, 108.
SOFTENING, 327.
SOMNOLENCY,
    how feigned and detected, 600.
SMOTHERING,
    death by, how accomplished, 449.
    signs or indications of death by, 450.
SOMNAMBULISM, 518.
    cases of, 520.
    legal consequences of, 585.
SPECIFIC GRAVITY,
    of lungs increased by disease, 164.
SPLEEN,
    wounds of the, 233.
SPARA HIERONYMA,
    account of, 290.
SOUFFLE, OR PLACENTAL SOUND,
    what, 60.
    its seat and characters, 61.
    how imitated, 61
STARVATION,
    persons found dead from, 455.
    symptoms attending death by, 455.
    time in which death is produced by, 456.
    post-mortem appearances caused by, 456.
    a means of destroying new-born child, 181.
SPINAL CORD,
    injuries to, 226.
SPRAIN,
    what, 214.
SPRAGUE, CHARLES,
    remarkable case of, 503.
STANWIX, GENERAL,
    case of, 620.
STEWART'S EXECUTOR, vs. LISPENARD
    case of, 566.
STATIC TEST,
    what, 145.
STERILITY,
    what, 3.
    generally confined to female, 16.
    causes of, 16.
STOMACH,
    inflammation of, distinction between, and irritant poisoning, 323.
    distention of, distinction between, and irritant poisoning, 324.
    rupture of, distinction between, and irritant poisoning, 324.
    water in, in death from drowning, 435.

STOMACH AND INTESTINES,
  redness of, how caused, 325.
STRANGULATION,
  differences observable between, and death from hanging, 446.
  whether cause of death, or resorted to afterwards, 447.
  whether accidental, suicidal or homicidal, 448.
  means of destroying life of new-born child, 186.
STRYCHNIA,
  a destructive poison, 407.
SUICIDE,
  legal consequences of, 582.
  facts showing it insane, 509.
SUICIDAL MONOMANIA, 508.
SULPHURETTED HYDROGEN GAS, 403.
  symptoms, and post-mortem appearances caused by, 404.
SUFFOCATION,
  a means of destroying life of new-born child, 179.
SUGILLATION,
  a cadaverous lividity, 205.
  how distinguished from ecchymosis, 206.
SUPERFŒTATION,
  possibility of, 76.
  reasons against, 76.
  answers to same, 77.
  cases of, 77 - 78.
  explanation of, 79.
SURVIVORSHIP,
  when necessary to be enquired into, 618.
  when between mother and child, 618.
  when two or more destroyed by common accident, 619.
  provisions of Code Napoleon in relation to, 619.
  cases illustrating, 620.
SUSPENSION OF RESPIRATION,
  a cause of death by hanging, 440.
SWETE vs. FAIRLIE,
  case of, 622.
SYMPATHY,
  action of poisons by, 296.
  reasons for, 297.
  answer to reasons, 298.
SYMPTOMS,
  one source of evidence in case of poisoning, 305.
  suddenness of their occurrence, 305
  regularity in their increase, 306.
  uniformity in their nature, 306.
  beginning soon after a meal, 306.
  appearing during a state of health, 307.
  comparing them with those of natural disease, 307.
  developed through irritant class of poisons, 321.
  of poisoning with arsenic, arranged under three heads, 347.

SYMPTOMS—*(Continued.)*
  of poisoning with copper, 371.
  of poisoning with lead, 376.
SYNCOPE,
  what, 426.
  what it arises from, 427.
SYNCOPE AND HYSTERIA,
  how feigned and detected, 599.

T.

TAYLOR,
  case of, 620.
TEMPERATURE,
  high, essential to putrefaction, 422.
TENANT, Rev. WILLIAM,
  extraordinary case of, 416.
TENANT BY THE CURTESY,
  what, 112.
TESTICLE,
  defect or disease of, 8.
  one sufficient for impregnation, 9.
TESTICLES,
  when not found in scrotum, 9.
  diseases to which they are subject, 9.
  connection between and cerebellum, 10.
  structure of, defective, 10.
TESTS OF COPPER, 370.
THECAR,
  case of, 89.
THOM,
  case of, 311.
THOMPSON ads. COMMONWEALTH OF MASSACHUSETTS,
  case of, 382.
THORAX,
  changes effected in by respiration, 149.
  wounds of the, 228.
THROAT AND NECK,
  wounds of the, 227.
THURLOW, LORD,
  his definition of lucid interval, 527.
TIME,
  interval of, a circumstance modifying the medico-legal character of wounds, 268.
TISSUES
  differ in their power of absorption, 301.
TOFFANIA,
  account of, 289.
TONGUE,
  position of in persons drowned, 434.

TOWNSEND, Col.,
extraordinary case of simulating death, 416.
TRACHEA,
water found in, in case of death from drowning, 435.
or larynx, laceration of, cause of death by hanging, 441.
TRANCE,
state resembling death, 416.
TREATMENT
in case of poisoning by mercury, 369.
in case of poisoning with copper, 372.
TUMORS AND ENLARGEMENTS,
how feigned, 602.
TURNER,
case of, 280.

U.

ULCERATION, 328.
ULCERS,
how feigned, 603.
false, how detected from the real, 604.
UMBILICAL VESSEL,
what, 144.
changes in, 171.
UMBILICAL CORD,
successive changes in, after birth, 174.
withering of, 174.
dessication, or drying of, 175.
separation of, 175.
neglect of tying, 189.
UMBILICUS,
state of during pregnancy, 54.
cicatrization of, 176.
URETHRA,
unnatural situation of, 7.
URINE,
changes in, indicating pregnancy, 43.
UTERINE,
a sensible sign of pregnancy, 52.
UTERINE HYDATIDS,
how occurring, 64.
how long retained, 64.
UTERUS,
changes in, on conception, 40.
continuation of changes, 41.
order of changes in, 58.
changes, how produced, 58.
how appearing when examined after death, 65.
morbid growths in, 72.

V.

VAGINA,
    narrowness of, in virgin state, 15.
    same as connected with rape, 27.
    bluish tint of evidence of pregnancy, 62.
VAN ALST., vs. HUNTER,
    case of, 562.
VENESECTION,
    as a cause of abortion, 131.
VIABILITY,
    what, 115.
VINE DRESSER,
    case of, 514.
VIOLENCE,
    marks of, in bodies found in water, 438.
VIRGINITY,
    signs of, when most perfect, 28.
    inferences from, 28.
VOLITIONS AND ACTIONS,
    what, 575.
VOLUME OF LUNGS,
    affected by respiration, 150.
VOMITING,
    how feigned, and detected, 597.

W.

WAGNER, Dr.,
    remarkable case related by, 137.
WALLACE, Dr.,
    case reported by, 261.
WATSON, vs. MAINWARING,
    case of, 622.
WEAKNESS,
    how caused and feigned, 597.
WEAPON,
    with which wound was inflicted, 236.
    employed, nature of it, 259.
WEBSTER, Dr.,
    case of, 615.
WEIGHT,
    of the fœtus at birth, 109.
WHELAN, vs. WHELAN,
    case of, 557,
WHISTELO,
    case of, 91.
WHITING, JUDGE,
    charge to the jury in the case of Freeman, 552.

WILDBERGH,
    case related by, 311.
WILLIAMS, LUCY,
    case of. 91.
WILL,
    what, 559.
    how to be executed, 560.
    what diseases disqualify, 560.
WILSON,
    case of impotence related by, 7.
WILSON, THEODORE,
    case of, 547, 588.
WITHERING,
    of the cord, when, 174.
WITNESSES,
    either common or skilled, 625.
    duties of, when called on to the stand, 625.
    direct examination, object of, 626.
    " " value of, 626.
    cross-examination, object of, 626.
    duties as to citing medical authorities, 626.
    confessions to lawyers, clergymen and physicians, 627.
    duties as to confessions of parties, 627.
    refusing to testify, consequence of, 628.
    testifying to confession, 628.
    testifying to dying declarations, 628.
    before coroner; duties and compensation, 426.
WOUND,
    was it the direct cause of death?
    its nature and situation, 247.
    its direction, 248.
WOUNDS OF THE HEAD, 221.
WOUNDS,
    what circumstances modify their medico-legal character, 267.
    general consideration of, 198.
    definition of, 199.
    division of, 199.
    medico-legal questions arising in, 235.
    whether self-inflicted or not, 246.
    incised, different stages of, 264.
    inflammatory stage, 264.
    purulent stage, 264.
    cicatrization stage, 264.
    gangrene stage, 266.
    a means of destroying life of new born child, 181.

LIBRARY
SCHOOL OF LAW
WITHDRAWN

LIBRARY
SCHOOL OF LAW, S.C.

UC SOUTHERN REGIONAL LIBRARY FACILITY
AA 000 825 388 2